SOFTWARE DEVELOPMENT OUTSOURCING DECISION SUPPORT TOOL WITH NEURAL NETWORK LEARNING

THESIS

James D. Newberry, Captain, USAF
AFIT/GCS/ENG/04-16

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

AFIT/GCS/ENG/04-16

AFIT/GCS/ENG/04-16

SOFTWARE OUTSOURCING DECISION SUPPORT TOOL WITH NEURAL NETWORK LEARNING

THESIS

Presented to the faculty of the

Department of Electrical and Computer Engineering

Graduate School of Engineering & Management

Air Force Institute of Technology

Air University

In Partial Fulfillment of the

Requirements for the Degree of

Master of Science

James D. Newberry, B. S.

Captain, USAF

March 2004

AFIT/GCS/ENG/04-16

SOFTWARE DEVELOPMENT OUTSOURCING DECISION SUPPORT TOOL WITH NEURAL NETWORK LEARNING

THESIS

James D. Newberry, B. S.
Captain, USAF

Approved:

Brian G. Hermann — 12 Mar 2004

Brian G. Hermann, Lt Col, USAF — Date
Chairman

Robert J. Weber — 12 Mar 2004

Robert J. Weber, Maj, USAF — Date
Committee member

G. R. Gowda — March 12, 2004

Raghava Gowda, PhD — Date
Committee member

ACKNOWLEDGEMENTS

First and foremost, I would like to praise God for blessing me with good health and a wonderful support environment. Without such blessings, all would be pointless.

I would like to say thanks to Mom, who was with me every step of the way, her belief in me gave me strength when I needed it the most. Thanks Dad for supporting Mom and her many trips to see me. Also, I would like to say thanks to all my family members and friends who provided words of encouragement.

Lt Col Brian G. Hermann was instrumental for my work. His leadership and patient support guided me throughout this research. Thank you for the confidence you had in me to continue your previous dissertation work.

I would also like to thank my committee members, Major Bob Weber and Dr. Raghava Gowda, for taking time away from their schedules to review my work. Dr. Dursun Bulutoglu, thanks for providing help with the statistical analysis. Also, the support staff at Neurosolution (Gary, Lisa and Dan), deserves a healthy thank you for answering dozens of phone calls and E-mail messages. Their expert neural network guidance was paramount for this research.

Lastly, I would like to thank the USAF and AFIT for supporting this thesis.

James D. Newberry

TABLE OF CONTENTS

ACKNOWLEDGEMENTS .... **V**

TABLE OF CONTENTS **6**

LIST OF FIGURES **8**

LIST OF TABLES **9**

ABSTRACT **10**

1. RESEARCH INTRODUCTION **11**

1.1 PROBLEM 11
1.2 BACKGROUND 11
1.3 THESIS GOAL 12
1.4 MOTIVATION 13
1.5 THESIS DOCUMENT LAYOUT 15

2. BACKGROUND **16**

2.1 INTRODUCTION 16
2.2 SOFTWARE DEVELOPMENT OUTSOURCING 16
2.2.1 History *17*
2.2.2 IT Outsourcing vs. Software Development Outsourcing *18*
2.2.3 Benefits and Drawbacks *19*
2.2.4 Strategies *20*
2.2.5 Outsourcing Survey *27*
2.2.6 Mitigation Efforts *34*
2.2.7 Future *40*
2.2.8 Software Outsourcing Topic Conclusion *45*
2.3 LEARNING MECHANISMS 45
2.3.1 Neural Network History *49*
2.3.2 Comparison Studies *50*
2.3.3 Neural Network Project Planning Concerns *55*
2.3.4 Neural Network Feasibility Concerns *57*
2.3.5 Neural Nework Data Concerns *59*
2.3.6 Topic Conclusion *64*
2.4 SUMMARY 65

3. METHODOLOGY **66**

3.1 INTRODUCTION 66
3.2 PREVIOUS RESEARCH 66
3.3 RESEARCH ACTIVITIES 67
3.3.1 Tool Selection and Evaluation *67*
3.3.2 New Survey Data Transformation *69*

3.3.3 New Survey Data Analysis ... *70*
3.3.4 Regression Model Creation ... *70*
3.3.5 NN Development ... *71*
3.3.6 SODS2 Development ... *72*
3.4 SUMMARY ... 73

4. IMPLEMENTATION RESULTS ... 74

4.1 INTRODUCTION ... 74
4.2 SURVEY DATA TRANSITION ... 74
4.3 SURVEY DATA ANALYSIS ... 75
4.3.1 Outsourcing Experience Analysis ... *75*
4.3.2 Outsourcing Project Assertion Analysis ... *76*
4.3.3 Outsourcing Goal Importance Analysis ... *86*
4.3.4 Outsourcing Goal Realization Analysis ... *88*
4.3.5 Outsourcing Consequences Analysis ... *90*
4.3.6 Survey Data Analysis Summary ... *92*
4.4 REGRESSION MODEL IMPLEMENTATION ... 93
4.4.1 Regression Modeling Technique Validation ... *93*
4.4.2 Regression Model Differences in 14 Goal Realizations ... *94*
4.4.3 SODS2 Consequence Regression Models ... *96*
4.4.4 Regression Model Summary ... *123*
4.5 NEURAL NETWORK IMPLEMENTATION ... 124
4.5.1 Neural Network Design Portion ... *124*
4.5.2 Cross Validation Portion ... *125*
4.5.3 Neural Network Data Problem ... *126*
4.5.4 Neural Network Training Without Cross Validation Portion ... *126*
4.5.5 Neural Network Interface Portion ... *127*
4.5.6 NN Implementation Summary ... *127*
4.6 SODS2 IMPLEMENTATION ... 128
4.6.1 SODS2 Development Tool ... *128*
4.6.2 SODS2 Validation Phase ... *129*
4.6.3 SODS2 Implementation Summary ... *132*
4.7 SUMMARY ... 133

5. CONCLUSION AND FUTURE WORK ... 134

5.1 INTRODUCTION ... 134
5.2 CONCLUSIONS AND CONTRIBUTIONS ... 134
5.3 FUTURE WORK ... 137

BIBLIOGRAPHY ... 139

LIST OF FIGURES

Figure 1 Outsourcing Benefits and Drawbacks [7, 8, 11, 13, 14, 16, 17] 20
Figure 2 Software Outsourcing Facets [13] 21
Figure 3 Software Outsourcing Scale [11] 21
Figure 4 Software Application Outsourcing Example [13] 22
Figure 5 Outsourcing Percentage Chart [11] 23
Figure 6 Competencies Interaction Diagram [13] 24
Figure 7 Core vs. Non-Core Decision [13] 25
Figure 8 In-house vs. Outsource Decision Model [13] 26
Figure 9 Software Development Outsourcing Model [11] 27
Figure 10 Software Outsourcing Decision Makers [11] 30
Figure 11 Process Outsourcing Measurements [11] 31
Figure 14 Outsourcing Goal Satisfaction [11] 32
Figure 15 Software Outsourcing Consequences [11] 33
Figure 16 Partnerships [36] 43
Figure 17 NN Visual Definition [39-42] 48
Figure 18 NN vs. Expert Systems [43] 53
Figure 19 NN Software Lifecycle Model [39] 56
Figure 20 MLP NN Training Error Plot [39] 63
Figure 21 Cross-Validation [39] 64
Figure 22 Old Survey Data Outsourcing Experience [11] 75
Figure 23 Old Survey Data Project Assertion Analysis [11] 77
Figure 24 New Survey Data Project Assertion Analysis 78
Figure 25 Old Survey Data Relationship Assertion Analysis [11] 79
Figure 26 New Survey Data Project Assertion Analysis 79
Figure 27 Old Survey Data Project Goal Assertion Analysis [11] 81
Figure 28 New Survey Data Project Goal Assertion Analysis 81
Figure 29 Old Survey Data Process Assertion Analysis [11] 82
Figure 30 New Survey Data Process Assertion Analysis 83
Figure 31 Old Survey Data Product Assertion Analysis [11] 84
Figure 32 New Survey Data Product Assertion Analysis 84
Figure 33 Old Survey Data Product Related Assertion Analysis [11] 85
Figure 34 New Survey Data Product Related Assertion Analysis 86
Figure 35 Old Survey Data Outsourcing Goal Importance [11] 87
Figure 36 New Survey Data Outsourcing Goal Importance 87
Figure 37 Old Survey Data Outsourcing Goal Satisfaction [11] 89
Figure 38 New Survey Data Outsourcing Goal Satisfaction 89
Figure 39 Old Survey Data Consequence Analysis [11] 90
Figure 40 New Survey Data Consequence Analysis 91
Figure 41 New Survey Data Consequence Differences Analysis 92
Figure 42 Summary of Old, New and Combined Models 98
Figure 43 Validation Sample 129
Figure 44 Validation Summary 131

LIST OF TABLES

TABLE 1 FIVE MAIN CAUSES FOR SOFTWARE PROJECT FAILURE [4] 13
TABLE 2 A-76 FINDINGS [7] 14
TABLE 3 SOFTWARE OUTSOURCING DEFINITION'S THREE SERVICES [11] 17
TABLE 4 STRONG CONTRACT FACTORS [7] 19
TABLE 5 SURVEY GOALS [11] 28
TABLE 6 MITIGATION EFFORTS 34
TABLE 7 SOFTWARE OUTSOURCING SPECIFIC MITIGATION EFFORTS 37
TABLE 8 JOINT REVIEW ALIGNMENT STEPS [25] 37
TABLE 9 INFORMAL COMMUNICATION EFFORTS 38
TABLE 10 KNOWLEDGE SCOUT PROGRAM REQUIREMENTS [28] 38
TABLE 11 COCPIT SOFTWARE DEVELOPMENT DIMENSION [23] 39
TABLE 12 BUYING/BUILDING SOFTWARE DRAWBACKS [35] 41
TABLE 13 ASP BENEFITS [35] 41
TABLE 14 ASP DRAWBACKS [35] 42
TABLE 15 ASP CONTRACT ISSUES [34, 35] 42
TABLE 16 NN KEY ATTRIBUTES 52
TABLE 17 COMPARISON STUDY'S NN [44] 54
TABLE 18 NN DRAWBACKS 55
TABLE 19 NN PROJECT DIFFERENCES [39] 55
TABLE 20 NN APPLICATION EXAMPLES 58
TABLE 21 REQUIRED NN CRITERIA [39, 41] 58
TABLE 22 NN BENEFITS [39] 59
TABLE 23 NN RISKS [39] 59
TABLE 24 MLP NN TASKS [39, 40] 62
TABLE 25 COMMON NN PROBLEMS [39] 64
TABLE 26 SODS2 HIGH LEVEL REQUIREMENTS 73
TABLE 27 NEW SURVEY DATA OUTSOURCING EXPERIENCE 76
TABLE 28 VALIDATION SAMPLE TABLE 130

ABSTRACT

The Air Force (AF) needs an evolving software tool for guiding decision makers through the complexities of software outsourcing. Previous research identified specific outsourcing strategies and linked them to goals and consequences through a variety of relationship rules. These strategies and relationship rules were inserted into a decision support tool. Since that time, more historical data and outsourcing literature has been collected thus necessitating an update to such a tool. As the number of software outsourcing projects are completed, the AF must capture the outsourcing decision experiences which guided the projects and their outcomes. In order to efficiently incorporate this new experience, the decision tool must be redesigned to allow the additional knowledge to be added in such a way that the decision rule base is automatically updated. With this new feature, the tool would increase its precision of predicting software outsourcing success as the software outsourcing knowledge evolves. Capturing software outsourcing as knowledge instead of raw information will help guide decision makers down paths proven to succeed staying clear of risks that historically plagued software outsourcing projects of the past. Software outsourcing decision makers desire not only a characterization of past experiences and predictions of future outcomes, but also reasons to help them make informed decisions.

SOFTWARE DEVELOPMENT OUTSOURCING DECISION SUPPORT TOOL WITH NEURAL NETWORK LEARNING

1. Research Introduction

1.1 Problem

The Air Force (AF) is rapidly losing tacit decision knowledge in the area of software development outsourcing as experienced decision experts leave due to a declining work force. Considering that knowledge is the greatest capital of an organization, a considerable effort must be made to capture it [1]. The raw data of past software development outsourced projects and associated outcomes must be captured and modeled for software outsourcing decision makers to predict solution paths for future software outsourced development projects. Neural networks and stepwise regression will provide the means of codifying and modeling this raw data into knowledge. Without the use of such learning mechanisms in the design of a software outsourcing decision support tool, the outsourcing experience data will go unused preventing the evolution of outsourcing costing the AF money and other resources.

1.2 Background

Under current policy and the given manpower shortages, software outsourcing is the first choice for USAF software development. Thus, most Air Force software project managers chose to partially or wholly outsource their software efforts with little thought to realistic outcomes. Another policy, utilization of best commercial practices, dictated

that we codify historical outsourcing data from industry and government projects and apply those lessons to current outsourcing strategy decisions.

Air Force software project managers, acquirers, and contract software developers would benefit from a continuous evolution of practical rules, models, and a tool to guide decision-making as it relates to software outsourcing ventures. As future project data is obtained, the tool should improve its ability to predict outsourcing consequences. Also, capturing software outsourcing knowledge from historical outsourcing data will help guide decision makers toward proven outsourcing strategies. Future decision makers will benefit from both projected outcomes and the knowledge behind the suggested strategies.

1.3 Thesis Goal

The primary goal of this research was to expand existing outsourcing decision-making support rules into new conventions that predict software outsourcing outcomes. This learning process must be incorporated into an extensible decision support tool designed to accept a flow of new historical outsourcing data. As the new data is processed, this tool should help identify and discover new relationships while at the same time quantify the usefulness of the tool's current decision-making rules that influence and predict software outsourcing consequences and results. This type of extensible tool will facilitate knowledge creation and future outsourcing strategy decisions. Neural Networks (NN) and statistical-based techniques had shown to be extremely useful for capturing such tacit knowledge; thus will be investigated as possible learning mechanisms.

1.4 Motivation

Past outsourced software projects have been plagued with drastic failures contributing with launching vehicles shooting wildly out of control, battle cruisers being towed back to port, stealth fighters losing access to their target support software due to a reboot, Patriot missile system falling off-track some 678 meters causing 28 deaths and 98 injured, etc… [2, 3] With only one out of ten projects finishing on time and within budget and 30% of government projects not even being delivered at all, software projects' results were woefully lacking especially considering Department of Defense (DoD) is paying $42B annually for software acquisitions [2].

This track record could no longer be blamed on technology or shortage of computer power. Mosemann and other leading software practitioners viewed software management as the leading cause of software project letdown with the five most common software management failures elaborated in Table 1 [4].

Table 1 Five Main Causes for Software Project Failure [4]

1. Unrealistic project schedule with no true way to estimate development time
2. Inappropriate staffing, not enough expertise, or unstable staff
3. Changing of requirements (many essential to the project)
4. Poor quality of work normally brought on by poor quality processes
5. Belief that lost time will be made up later in schedule (reducing testing time)

Senior leaders of the U.S. Government have made it perfectly clear that we must improve our oversight management. President Bush publicly endorsed outsourcing and insisted that our top executives strive to apply outsourcing in the most effective manner utilizing the competitive market, providing the taxpayer the best possible fighting force [5]. Secretary of Defense Rumsfield, at the 2003 DoD Budget Briefing, stressed using

outsourcing in a smart and efficient manner emphasizing that we must use new methods along with the A-76 study (outsourcing efficiency study) to correctly apply outsourcing [6]. In 1997, Secretary of Defense Cohen stated "we still do many things in-house that we could do better and cheaper through outsourcing." [7] In 1994, Secretary of Defense Perry urged DoD to adopt current civilian best practices streamlining software development acquisitions into the experienced hands of commercial outsourced software developing vendors [8]. In 1996, the Defense Science Board, backed by bills in both House and Senate, mandated cost comparative A-76 studies to compare in-house vs. outsourcing for providing DoD information technology supporting functions [7]. With this senior leadership direction, skills and knowledge on outsourcing software development must be evolved to correct this less than desirable trend [4]. In a Naval Analysis Center study, Sam Kleinman researched a 1000 A-76 studies and his findings are summarized in Table 2, listed below [7]:

Table 2 A-76 Findings [7]

1. Savings were not from outsourcing but from reducing number of workers 2. Three percent of experienced government technical workers switched over to work for the contractor 3. Contractor audited show no such savings over government workers 4. Cost of A-76 competition was not included against projected savings 5. Savings represented were projected savings rather than actual savings

The A-76 findings were unacceptable and improvements crucial. To do this, one must know the when's, what's and how's of outsourcing. The experience of outsourced projects must be captured and analyzed. Given the amount of data and factors relating to this experience, analysis techniques must be explored so the knowledge can be formed from this raw data.

One such technique involved the use of Artificial Intelligence (AI). On 3 Feb 1994, the USAF Assistant Secretary sent an AF publicly distributed letter concerning the use of AI. This letter urged the research and studies necessary to exchange information and improve decision making [9]. With this motivation to seek the advantages of AI, this thesis will focus on two techniques for analyzing this software outsourcing data: stepwise regression and NN systems.

1.5 Thesis Document Layout

Chapter Two will summarize the literature researched: 1) software outsourcing and 2) NN and stepwise regression techniques. Upon building a firm understanding of these topics, Chapter Three will outline a methodology plan for building a decision support tool. Along with this plan, measurements and validation concerns will be stated in Chapter Four. Finally, in Chapter Five, conclusions, issues and future work will be given so that this complex software outsourcing decision making knowledge can be evolved parallel with the evolution of software engineering.

2. Background

2.1 Introduction

This chapter includes a literature review helpful in establishing the foundation for the thesis. The research is separated into two main topics: software development outsourcing and neural network/stepwise regression. Software development outsourcing is broken into eight sub-topics: history, outsourcing differences, benefits and drawbacks, strategies, survey results, mitigation efforts, future trends, and topic conclusion. Neural Network (NN)/stepwise regression is divided into six sub-topics: NN history, comparison studies, NN project planning concerns, NN feasibility concerns, NN data concerns, and topic conclusion. The chapter concludes with a summary discussing the overall findings and results of the literature review.

2.2 Software Development Outsourcing

Outsourcing has been defined in numerous ways. Washington defined outsourcing as a "contractual agreement between a customer and one or more suppliers to provide services or processes that the customer is currently providing internally," [7] and Power defined it as "the act of transferring some of a company's recurring internal activities and decision rights to outside providers, as set forth in a contract." [10] Herman expanded on these outsourcing definitions to include the specifics of software development outsourcing. His definition was broken into three services listed in Table 3 [11].

Table 3 Software Outsourcing Definition's Three Services [11]

1. Development of complete or partial software products
2. Purchase of packaged or customized package of software products
3. Activities to aid in the software development lifecycle model

Other terms associated with outsourcing included:

1. Privatizing - far left subset of outsourcing that includes the transfer of facilities, equipment and other government resources to private vendors to aid in the deliverance of the outsourced product,
2. Insourcing - augment the work force to handle work load ("rent-an-expert"),
3. Downsizing - eliminate employees, a common result of outsourcing, and
4. Alliance Outsourcing/Rightsourcing - use correct balance of in-house and outsourced resources to achieve maximum benefits [7, 10-14].

2.2.1 History

Outsourcing has had a distinguished past running parallel with the data processing history according to Ketler and Willems [15]. In the 1960's, large, expensive mainframes dominated the computer world. Software experts were very sparse. Companies were forced to outsource data processing needs due to these limitations. In the 1970's, computers and data processing became more powerful and less expensive. Few of the larger companies moved data processing function in-house to save money. Outsourcing still remained popular due to the lack of qualified computer experts. In the 1980's, computer cost declined while their popularity and usefulness drastically shot upward. Majority of companies concentrated on developing their own in-house Information Technology (IT) departments. In the 1990's, competitive market forces and in-house IT expenses forced companies to IT outsourcing using the 1989 Kodak IT outsourcing success story as their model. In the 2000's, after various outsourcing studies and research, companies faced a great decision: outsourcing vs. in-house [15].

2.2.2 IT Outsourcing vs. Software Development Outsourcing

Before delving into the factors of this decision, differences between IT and software development outsourcing must first be established. Power's thesis [10] included Kodak and Bell South Telecomm (BST) IT outsourcing case studies. Kodak found certain core software projects were best left in-house while successfully outsourcing non-core software. BST echoed similar results in that software outsourcing required complex monitoring, measuring, and planning. Power summarized by stating, "Software development is not easily defined, and does not produce easily measured outputs." He continued, "Much of software development fills the planning role since it involves analyzing processes within the company and designing software programs to accommodate the processes." His thesis showed that the companies studied had great success with other IT outsourcing not involving software development, but the complexities involved in software outsourcing exposed countless problems [10].

In Hermann's software outsourcing dissertation [11], he wrote: "Software development, however, differs from most outsourcing because companies are attempting to contract complex intellectual 'project' work rather than typical repetitious, well understood 'process' work." His point was aimed at showing how IT outsourcing was different than project-type software outsourcing. He continued by stating, "the vast collection of IT outsourcing experience literature is of limited value to a customer trying to select an outsourcing strategy to meet an organization's software development goals [11]."

In another DoD outsourcing case study performed by Washington [7], an AFMC $87M Software System saw difficulty in meeting and identifying essential software requirements. As a result, the outsourced project failed acceptance testing costing the AF an additional $4.5M to finish the project. In Table 4 below, Washington stated three factors needed for a strong contractual agreement which was crucial for the success of all outsourcing ventures.

Table 4 Strong Contract Factors [7]

1. The products/processes being outsourced must be completely defined.
2. Considerable effort must be spent to measure outsourcing productivity and savings.
3. Fairly accurate time estimation methods must be enforced.

In software development, these three factors plagued even the most successful projects which strengthened the belief that software development outsourcing must be considered differently than non-software IT outsourcing.

2.2.3 Benefits and Drawbacks

As identified above, software outsourcing created thorny challenges that could not be easily handled as other IT outsourcing. Benefits and drawbacks should be identified so that such challenges could be minimized. Several authors noted conflicting beliefs between benefits and drawbacks [7, 8, 11, 13, 14, 16, 17]. Figure 1 summarized these conflicts:

Outsourcing Benefits	Outsourcing Drawbacks
• Reduce Cost	• Increased Cost
• Increased Flexibility (economy of scale)	• B-Team syndrome / subcontracting
• Improved Focus ("do what we do best; outsrc the rest")	• Complexity of outsourced decision / oversight management
• Increased access to new technology (reduce dev. time)	
• Access to needed expertise	• Contractual overhead / litigation
• Sharing risks	• Reversibility
• Improved control	• Increased risks
• Cash flow from sale of intellectual property	• Reduced control
• Access to higher CMM level processes	• Legal ownership of intellectual property
• Capture knowledge (knowledge evolution)	• Loss of essential org skill (knowledge)
	• Security / confidentiality
• Improved product quality	• Negative work force psychological impact
	• Reduced quality

Figure 1 Outsourcing Benefits and Drawbacks [7, 8, 11, 13, 14, 16, 17]

This conflict accurately reflected the challenges from the Power and Washington case studies [7, 10]. Software outsourcing required complex outsourcing skills not found in IT outsourcing. To develop these skills, software outsourcing must be dissected into various parts and assembled into a model that can be comprehended. The goal was to maximize the required benefits while minimizing the drawbacks through using various strategies.

2.2.4 Strategies

Software development outsourcing strategies combined several aspects into a model used to comprehend the decisions that must be made to ensure such benefits are produced while keeping the drawbacks to a minimum. The first aspect reminded the decision maker of the different facets of software outsourcing. The relationship of these facets are summarized in Figure 2.

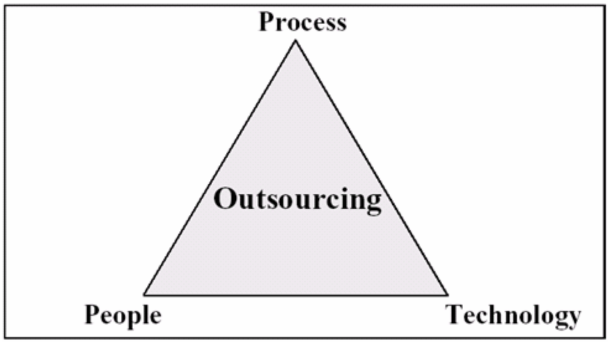


Figure 2 Software Outsourcing Facets [13]

People, processes and technology impacted the decision according to several references [11-13]. Software projects could require personnel expertise that was not available in-house. Certain Capability Maturity Model (CMM) level processes and/or methodologies requirements also affected this decision. Access to the latest technology could be required, but unavailable in-house. Each facet independently or collectively influenced the project [11-13].

A second aspect was concerned with the degree or type of outsourcing administered. Figure 3 showed the variety of outsourcing degrees/types:

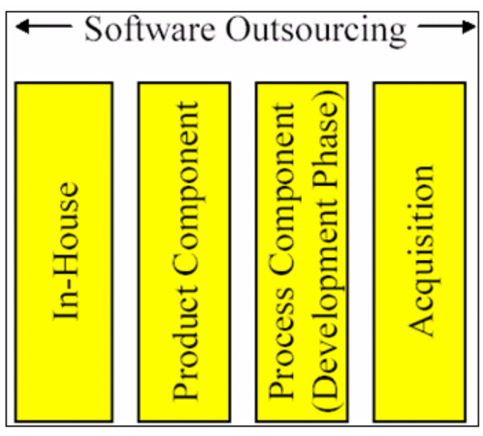


Figure 3 Software Outsourcing Scale [11]

In this figure, Hermann illustrated software can be completely developed in-house, acquired, or somewhere in the middle with product and/or process outsourcing. Frequently, Abbas [13] noted that projects had the tendency to use alliance outsourcing as shown in Figure 4.

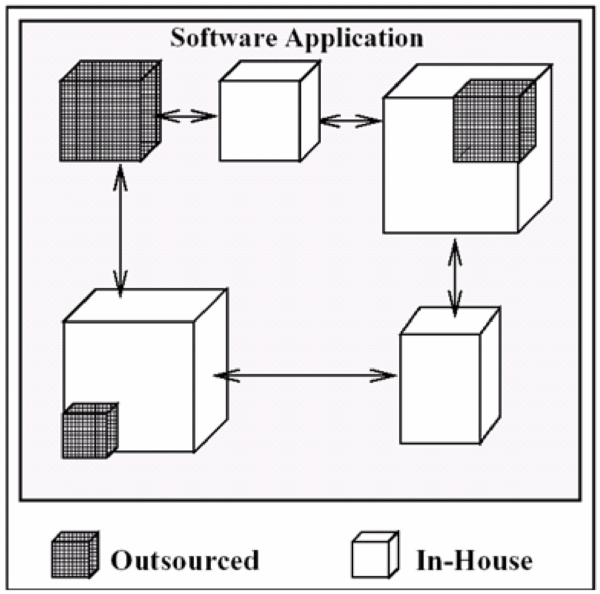


Figure 4 Software Application Outsourcing Example [13]

Both referenced documents showed the above software outsourcing composition [11, 13]. Each component could be completely outsourced or developed in-house. Certain components may be developed partly in-house and outsourced. Another variable depended on outsourcing particular processes needed to develop the application [11, 13]. The decision was best viewed as a grid of possibilities as shown in Hermann's Figure 5:

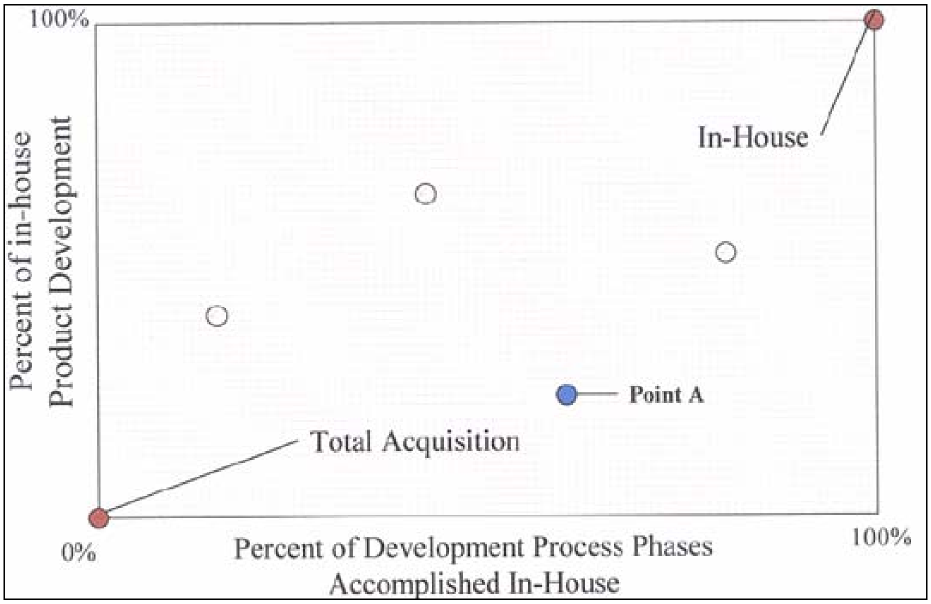


Figure 5 Outsourcing Percentage Chart [11]

In the case of point A, roughly 1/3 of its in-house processes were outsourced while 1/4 of the application's components were developed in-house. The decision possibilities were endless with no perfect rule to follow for making a successful decision. Each project's management climate, in-house expertise, schedule, goals, and other similar factors will impact such a decision which emphasized the need for a decision support tool [11].

A third aspect separated the development into core vs. non-core competencies. Both Kodak and BST found certain software was best suited for in-house development, while non-core software could be successfully outsourced [10]. Regardless of the type of software, the software oversight management should remain in-house [13, 14]. Figure 6 illustrated this relationship.

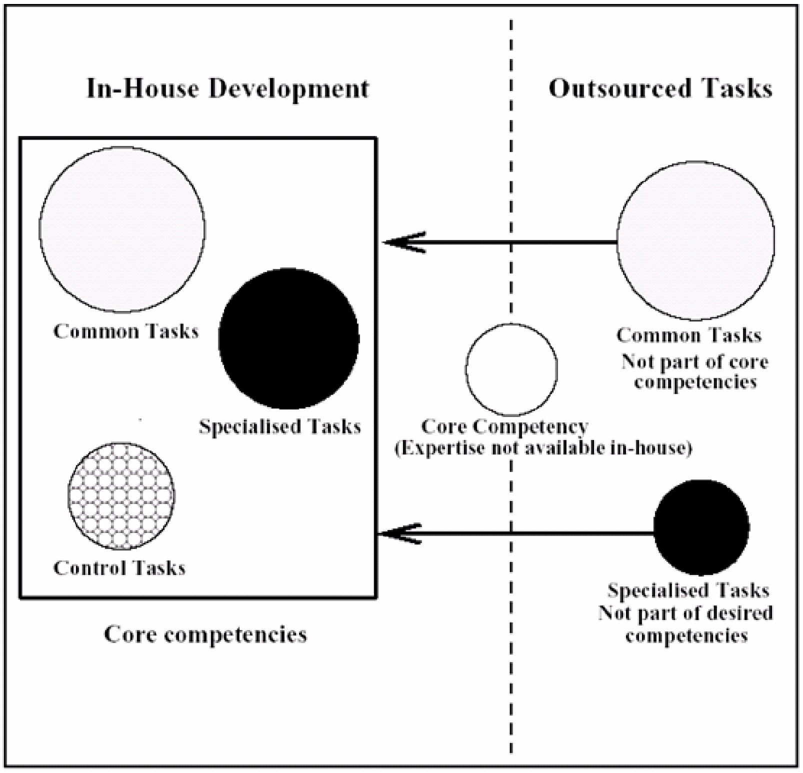


Figure 6 Competencies Interaction Diagram [13]

The decision between core vs. non-core should be kept in the software managers' fore-thoughts, as they make their way through the outsourcing dilemma. This decision resulted in a greater amount of work because it forced management to perform an internal analysis, a feasibility study, and a market forecast as shown in Figure 7.

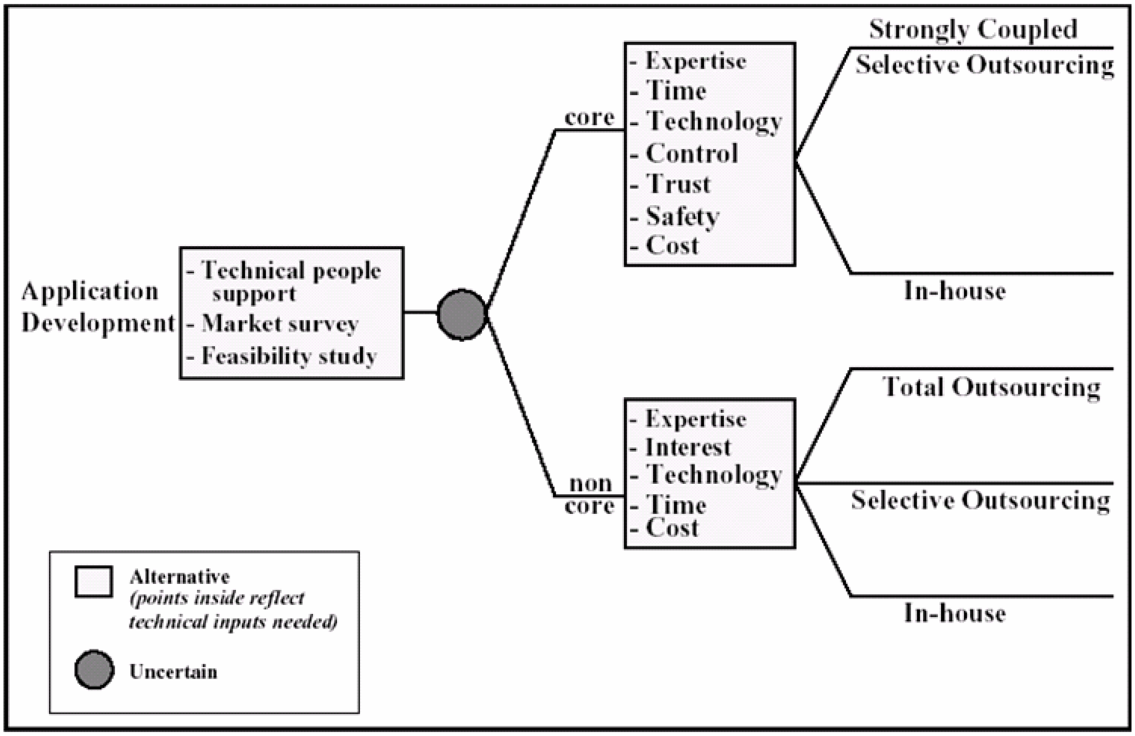


Figure 7 Core vs. Non-Core Decision [13]

The inputs of the analysis guided the software development decision by concentrating on the additional trust, safety, and control factors not associated with non-core software [11-14]. This added credence to Mosemann's DoD software outsourcing statement, "government needs enough in-house software expertise to know what it is buying" [4].

Taken together, these aspects and the desired benefits formed an outsourcing decision model, shown in Figure 8.

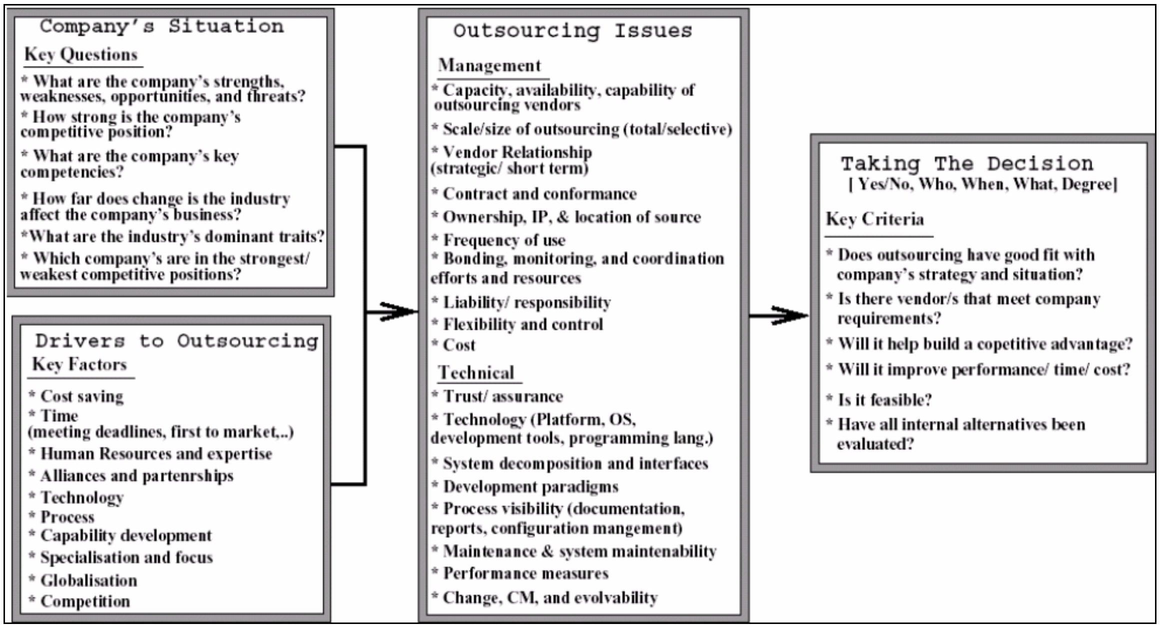


Figure 8 In-house vs. Outsource Decision Model [13]

The figure showed the required internal analysis input along with required benefits being fed into the second phase of studying the issues associated with outsourcing both on the management and technical levels. Management issues such as cost, control, responsibility, contract and outsourcing degree must be carefully thought out along with the technical issues of assurance/trust (safety levels), technology requirements, system interface, configuration management, maintenance, and similar issues. After the collection of the first and second phase information, an informed decision can be made (who, when, what degree and go/no go) [13].

If the decision was made to outsource, additional outsourcing knowledge, as shown in Hermann's software development outsourcing model, Figure 9, should be understood, so that outsourcing outcomes can be predicted based upon relationship rules built upon data collected on previous outsourced projects.

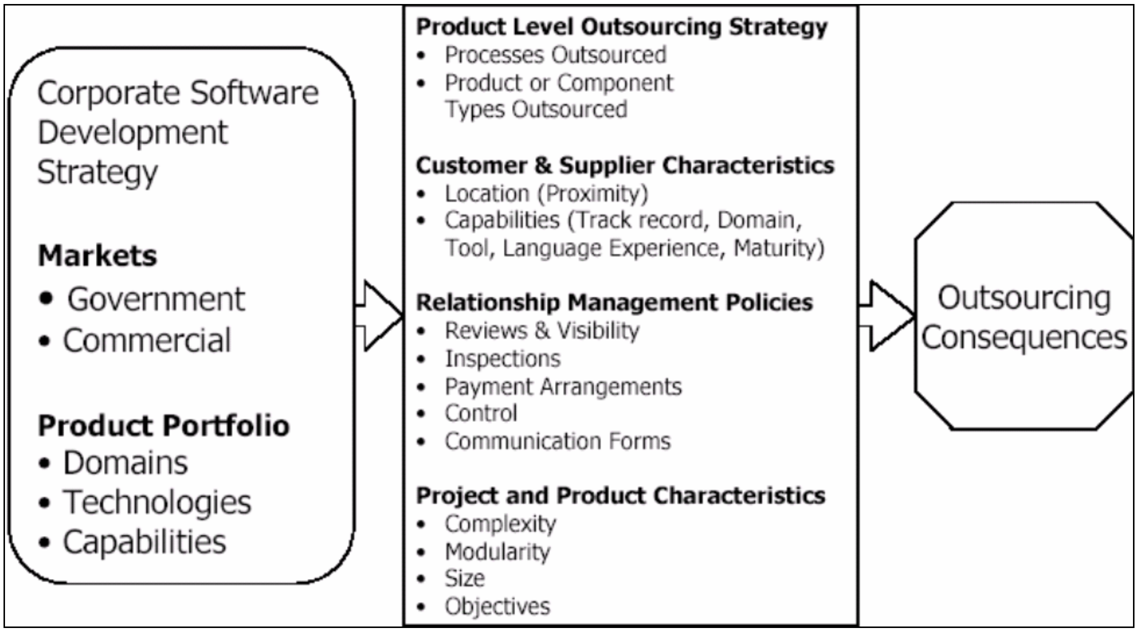


Figure 9 Software Development Outsourcing Model [11]

The similarities between both models in Figure 8 and Figure 9 were clearly evident. Each model took the various factors of the project and used them to point to an associated outcome. Before a consequence can be studied, the project's characteristics, the relationship management policies, the contractor's characteristics, and the degree of outsourcing information must be known. In addition, knowledge about the company's markets, domains, technologies and capabilities will help categorize such information relating to the outsourcing consequences [11].

2.2.5 Outsourcing Survey

In the section above, information was needed to predict a possible outsourcing outcome. Hermann [11] sought to do that very thing. He constructed a survey, included in Appendix G, to shift our focus from literature knowledge to real world experience

knowledge. Great care was taken to create a survey to minimize the influencing effects. Five survey goals were targeted in Table 5.

Table 5 Survey Goals [11]

1. Identify outsourcing decision makers 2. Distinguish which type of software development is most common (custom, COTS, customizable COTS, or none, all built in-house) 3. Measure which style of outsourcing is used most often (product, process or both) 4. Recognize which outsourcing goals businesses wished to achieve and found important 5. Summarize software outsourcing relationship rules relating to consequences and goals

2.2.5.1 Survey Data

Each respondent entered a vast amount of information categorized in the following way:

1. Personal information,
2. Amount of software outsourcing,
3. Experience, domain information relating to their last outsourcing venture,
4. Outsourcing process strategy information, outsourcing product strategy information,
5. Overall project goals for deciding to outsource,
6. Overall project consequences or outcomes as they relate to outsourcing,
7. Information relating to those organization and contractor roles that drove the decision to outsource,
8. Information relating to the respondents roles, and
9. Project, outsourcing relationship, outsourcing expectation, product strategy, and process strategy assertion (methods believed that increase the success of outsourcing)

Though all captured types of information are important to help understand the outsourcing experience, Hermann synthesized the data elements of the outsourcing domains, strategies, consequences, and assertions into his Software Outsourcing Decision support tool version 1 (SODS1) which was a central product of his dissertation. The

Boolean variables dealing with domains and strategies were known to the SODS1 application as input variables. The consequences and assertions were categorized as SODS1 output variables. These variables were integer type data being built using a Likert scale. Each input and output variables were separated into individual divisions and were included in Appendix G. In Hermann's dissertation, 87 rows of data (1 row per each survey) were collected. **T**he survey was placed in an interactive website allowing future respondents connected to the internet to take Hermann's survey online at http://www.eas.asu.edu/~outsrc/survey/. There were 48 new survey results collected since his initial research concluded [11].

2.2.5.2 Software Outsourcing Decision Support Tool Version 1 (SODS1)

SODS1 was designed using MS Access Visual Basic (VB) with an interactive (point and click) window type interface. The rules that were created and validated were then inserted into SODS1. The users entered their input data described in the survey data section. The relationship rules used this data to calculate an output. Such output was used by the users to forecast the consequence of their outsourcing decisions as it relates to their project [11].

2.2.5.3 Survey Results

Hermann captured outsourcing demographics goals, goal importance, consequences, and assertions about software outsourcing. This work established a baseline of outsourcing experience beyond anecdotal case studies. A few highlights of these findings were discussed below.

As expected, shown in Figure 10, the customer's project manager along with their corporate culture carried the most decision weight. It was interesting to note the impact that the vendor's project manager and company's culture had on the decision. Questions emerged from conflicts between the real world and researched materials. Researched materials implied the importance of technical and legal support [7, 8, 11, 13, 14, 16-18]. These roles were listed in the figure but took a back seat to management's influence [11].

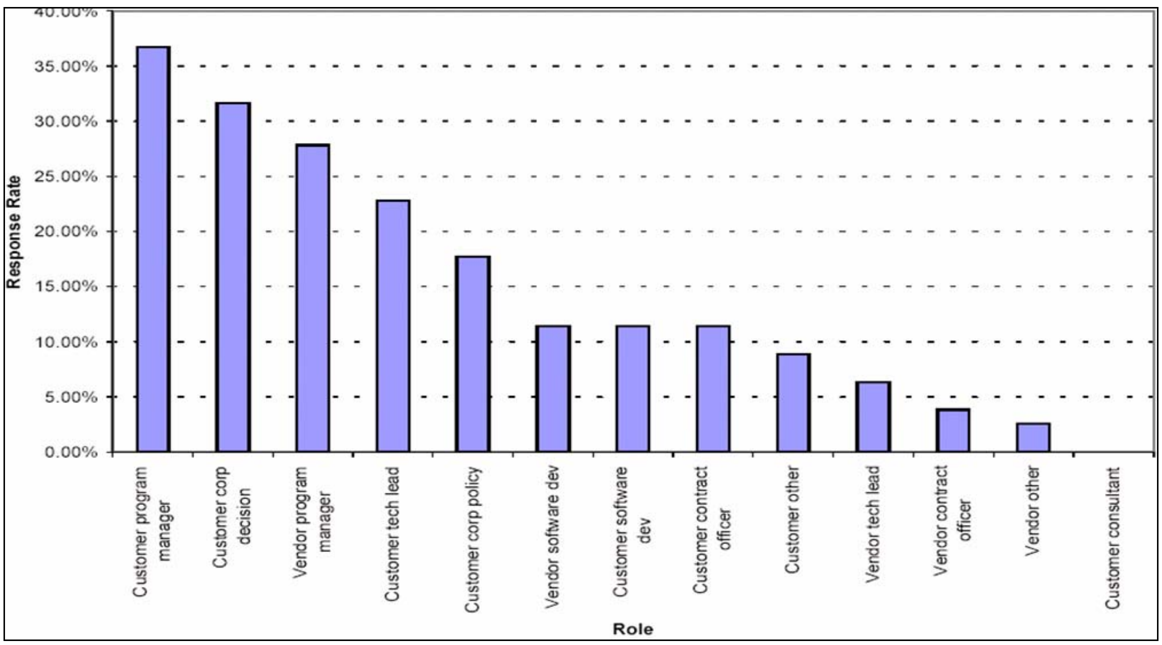


Figure 10 Software Outsourcing Decision Makers [11]

Next, Hermann established that custom software development was the predominant type of outsourced projects. The research also distinguished that hybrid outsourcing (the combination of process and product outsourcing) was most prevalent. Specifically, Figure 11 shows the frequency of outsourcing software process components.

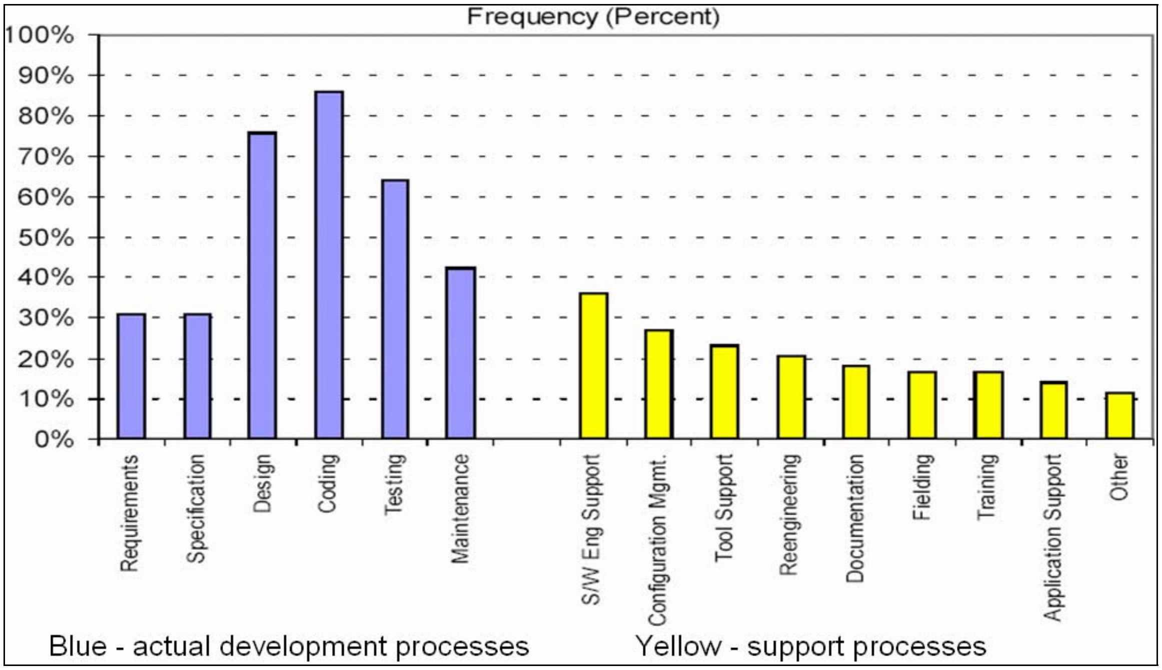


Figure 11 Process Outsourcing Measurements [11]

Actual development processes were more commonly practiced vs. support processes. The top four outsourced processes, coding, design, testing and maintenance, were consistent with the literature, but surprisingly, requirements and specification which took about 30% of those who used process outsourcing, ranked higher than most of the support processes. This directly contradicted what the researched literature identified [11].

Third, Hermann's research also studied which goals that companies found important and wished to achieve with outsourcing shown in Figure 12.

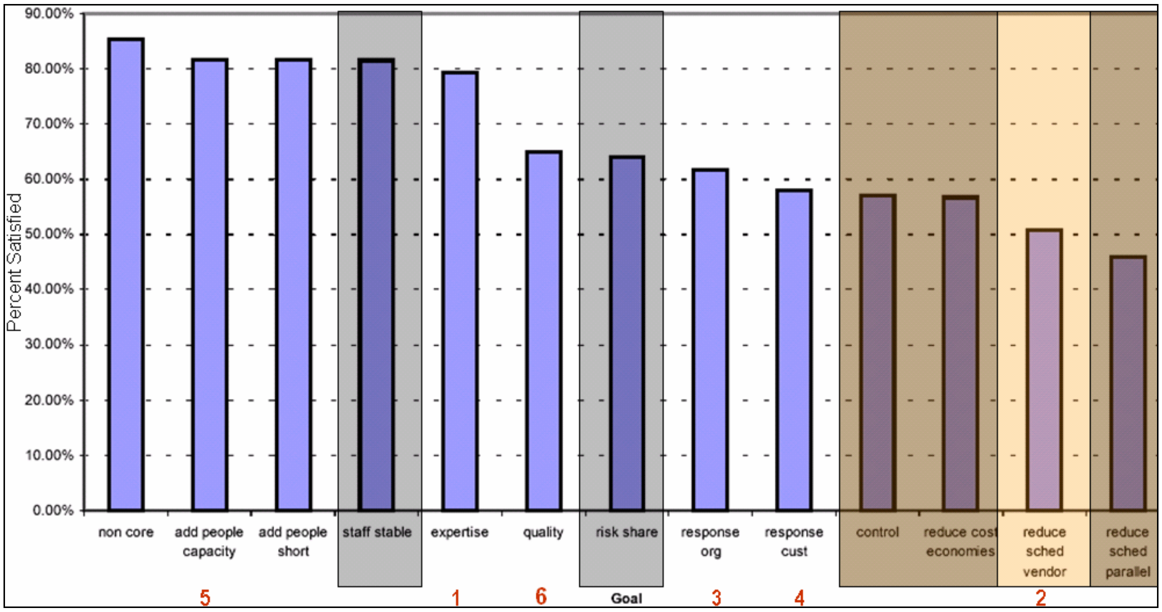


Figure 12 Outsourcing Goal Satisfaction [11]

Without the valuable T-test, these results would be at first misleading. Those four goals indicated within the brownish tint failed to meet the 95% confidence level and should not be considered. Those goals considered significantly unimportant were identified within the blackish tint. The red number (1-6) shown at the bottom of Figure 12 identified those goals that were found significantly important. Pointing out such importance proved beneficial in determining the amount of effort and resourced invested in such goals. It was interesting that the goal, reducing schedule, was found to be the second highest goal of importance but could not be considered due to its low confidence level. The other five significantly important goals showed positive signs with adding people, expertise and quality [11].

Finally, the consequences of outsourcing software projects were cataloged in Figure 13.

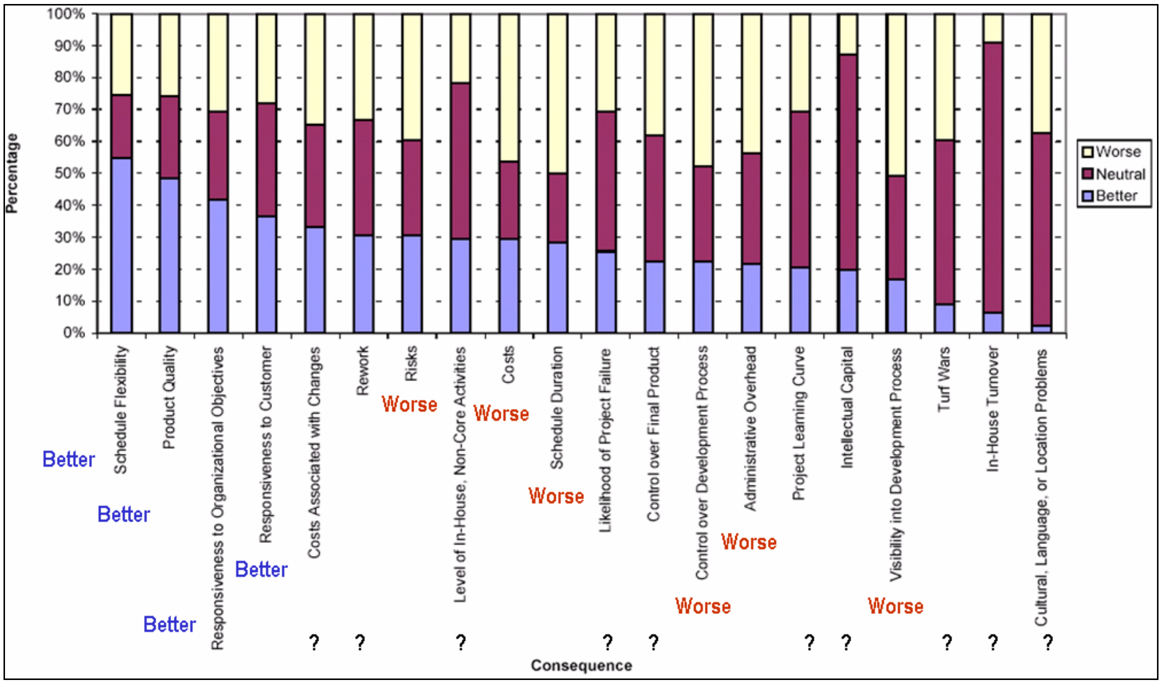


Figure 13 Software Outsourcing Consequences [11]

Software outsourcing was found to give the customers more flexibility in their schedule, improved product quality, and increase responsiveness to both organization's and customer's objectives. However, it was found to worsen the risks, cost, schedule duration, control, overhead and visibility [11]. As given in the above sections, literature conflicts not only each other but with these results as well [7, 8, 11, 13, 14, 16-18]. The question marks at the bottom of the figure signified the consequences that were unknown because the responses were either: 1) exceedingly neutral and/or 2) lacked a clear positive or negative tendency. Hermann used these assertions related to these goals as a means of guiding outsourcing mitigation efforts [11].

2.2.6 Mitigation Efforts

Given desired consequences, certain mitigation efforts may be employed to assure a positive software outsourcing environment that minimizes poor consequences. These efforts, for positively influencing software outsourcing, were taken directly from researched literature and summarized in Table 6 [4, 8, 10-14, 17-19, 22-31].

Table 6 Mitigation Efforts

1. Legal support [11-14, 16, 27]
2. Clear and concise requirement and testing specification [11, 14, 30]
3. In-house software expertise [4]
4. Clear and concise contract and Request For Proposal (RFP) [11-14, 16]
5. Intellectual ownership [16]
6. Solid software management principles [12]
7. Requirement and testing specs agreement [8, 13, 14]
8. Visibility and control oversight management measures [8, 10-12, 14, 30]
9. Positive attitude and relationship management [18, 31]
10. Joint software reviews [25]
11. Informal communications (knowledge management) [13, 19, 24, 28]
12. Knowledge scouts [28]
13. Software dimensions alignment [23, 27]
14. Estimation and metric practices [8, 10-12, 14, 30]

The first effort listed was concerned with the legal outsourcing relationship. Legal support was needed to provide guidance due to the possibilities of involving expensive court litigation and to the fact that software projects were plagued with failures according to [11, 12, 14, 16, 27]. The outsourcing oversight management team created two crucial documents, the contract and the RFP. These two products contained high level management goals for using outsourcing as well as providing legal guidance. By letting the contractor know the reason for outsourcing as discussed in the RFP, energies would then be focused on the same goals [11, 12, 14, 16, 27]. Requirement specification or the

process to attain such clear and testable requirements should also be stated in these documents [14]. Formal methods and function point analysis provided techniques to ensure a clear and testable process [11, 14, 30]. In-house software expertise support should be required for the oversight management team in their venture to produce the contract and RFP as preached in Mosemann [4]. The contract must also provide binding arbitration and cost reimbursement clauses that define penalties and award incentives preventing litigation. Oversight management should plan on handling disputes between customers and contractors. Chain of responsibility/authority and dispute management must be clearly stated to handle disputes at the lowest levels [14]. With nearly 30% of outsourced development ventures ending badly or even in court, legal support staff provided the oversight management team the best litigation prevention by ensuring the RFP and contract were written in terms to protect the customer [11, 14]. Intellectual property and security concerns should be addressed to prevent disastrous problems later in the development [16].

Other common outsourcing mitigation efforts involved solid software project management methods taught throughout the universities. In addition to these taught principles, testing standards must be planned, developed and agreed upon by both in-house software experts and outsourced vendors. Depending upon software criticality, quality and safety concerns, an Independent Verification and Validation (IVandV) contractor would serve as a watch dog protecting the interest of product quality and customer concerns [8, 13, 14].

Metrics offered the oversight management team visibility into the development of the software and some control over the final product. However, metrics were plagued with several cautions. They were expensive, require in-house analysis, were easily misleading, and should be included in the contract and RFP. Even with these cautions, metrics provided ways to track progress, schedule, errors, quality, and similar project measurements [12-14]

The oversight team must establish control mechanisms that make sense to the project and supported by the in-house software experts [4, 8, 13, 14]. With only one out of 10 large software projects completed on time, within budget and 30% of projects failing to be delivered (those delivered containing 42% of the planned requirements), oversight management team must be persistently involved [2, 14].

The [18, 31] articles added additional focus on personnel factors. Positive relationship and attitude management ensured communication flows freely in both directions. It eliminated the “We/They Finger Pointing”. Outsourced workers often had different agendas; therefore, must be checked especially when security concerns are at risk. Because of the individualistic goals of the contractor, care should be taken when assigning them to work with in-house teams [18]. People skills should also be carefully evaluated along with the technical skills when selecting a contractor to interface with in-house personnel [31].

Several authors showed mitigation efforts aimed specifically at software outsourcing. These efforts were included in Table 7.

Table 7 Software Outsourcing Specific Mitigation Efforts

1. Joint software reviews [25]
2. Informal communication [13, 19, 24]
3. Knowledge scouts [28]
4. Software outsourcing dimensions [23, 27]
5. Estimation and metric clarification [8, 10-12, 14, 30]

Joint software reviews provided an important communication mechanism for the contractor and customer to come together and to identify and solve issues relating to the project. Resources must be spent to ensure this review is successful and the review's efforts, energies and direction were aligned for all parties. To accomplish this alignment, six steps were listed in Table 8.

Table 8 Joint Review Alignment Steps [25]

1. Gather all meeting members goals concerning the review
2. Create shared group vision and goals
3. Collect members intentions, preferences and justification regarding this vision or goals
4. Discuss consequences of not meeting goals
5. Prioritize goals
6. Seek group consensus to press forward with the review

It was found that informal communication decreased as the distance between the customer and developing team increased. When this distributed (long distance) software outsourcing was compare to co-located software outsourcing, the co-located development finished 1.5 to two times faster than the development spread out over distance. The reason for this dealt with the decrease in informal communication and coordination [24]. In some instances, such as the need for certain types of software experts, this distributed software outsourcing was required; therefore, the following informal communication efforts listed in Table 9 should be implemented:

Table 9 Informal Communication Efforts

1. Instant messaging systems such as on-line chat seemed effective at building informal neighborhoods where knowledge transfer was found to increase [24]
2. Knowledge maps gave the developers an expert guide to who knows what (much like the yellow pages for the outsource development program). This decreased the time needed to solve coordination problems [19, 24, 32]
3. Identifying and building communication channels between experts that share common interest such as community of practices provided a synergy effect of knowledge creation vital to the development effort [24]
4. Web-based, shared calendars considered simple but effective at eliminating some of the basic coordination issues [24]
5. Knowledge scouts have proved useful in increasing informal communications [28].

According to [28] article, knowledge scouts were found crucial in increasing informal communications. A knowledge scout is a highly energized team focused on visiting the external contractual organizations to share/transfer knowledge. Face to face informal meetings provided trust, confidence, energy and a team atmosphere that was not available through video teleconferencing. Both contractual organizations must be willing to spend additional resources for this method to work. The following requirements listed in Table 10 will provide guidance for building an effective knowledge scout program:

Table 10 Knowledge Scout Program Requirements [28]

1. The team must know key project development information.
2. The team is rewarded for being alert, productive and active.
3. They must plan and coordinate several visits to all associated players.
4. Knowledge scouts require resources and a special brand of openness therefore the program must be stated in the contract and associated RFP.
5. Each member’s paycheck should be based on the amount of knowledge actually transferred.
6. The team should have an outgoing personality and people skills.
7. Members should be permanent because familiar faces seem to promote trust and confidence.
8. The knowledge scout program along with its visits should start early in the project to escape the investigator label.

References [23, 27] stated that software development dimensions must be aligned because of the different goals and cultures represented by both the customer and contracting organization. Six software development dimensions, also known as the COCPIT dimensions, were explained in the [23] article and summarized in Table 11.

Table 11 COCPIT Software Development Dimension [23]

1. **C**oordination/control focuses on different cultures between the companies.
2. **O**bjectives must be able to synch as well. Many contractors wanted to make a fast profit while the project needed a certain high degree of quality. Contractors in an effort to make more profit (their objective), assigned a B-team (a team with less expertise) to certain less lucrative projects so that their A-team could capture a large, expensive project. This was also the case when the contractors try to use subcontractors. Contract arrangements should account for some control in such events.
3. The project demands a certain type and amount of **C**apabilities. Having the skills not available and/or tied up in other projects adversely impacts the project. Selection of vendor should be based on capabilities not lowest bid.
4. Does the vendor define their methodology and **P**rocesses? The Capability Maturity Model (CMM) measure the maturity of such processes. The project due to its size and complexity may require a level 3, 4 or 5 CMM vendor. The oversight management team maturity level must also align well with the selected vendor or project frustrations might occur due to the gap between the organizations maturity levels. Methodologies also need to be judged between both teams.
5. **I**nformation communication was discussed in the earlier paragraphs. The oversight management teams should judge and select a vendor based on similar means of communicating and a willingness to communicate.
6. Both the software and development effort demands a certain level of **T**echnology. The software may require distributed-type qualities that influence how the software is built. Security/safety requirements influence both how the software may be built and/or the development nature of the software due to the software security classification. Also, technical concerns should focus on the digital communication needs between both customer and vendors.

In support of the first COCPIT dimension, Air Force Times recently printed an article about Boeing losing $1B due to integrity issues which fell out of alignment with the AF expectation [33]. In an extreme programming success article supporting the 4th

COCPIT dimension, case studies showed how important it is for both teams to be accustomed to the methodology (processes) before the projects starts [29]. In another article supporting such dimension it was found that certain methodologies work extremely well for certain projects of a certain size and complexity and not so well for the other software projects [22].

Rollo and Wright urged size/cost estimation and metric mitigation efforts focus their aims at providing a greater degree of control and visibility into the project. A planned, structured way of estimating must be practiced by the oversight management team. They also found that function point analysis was very successful at judging not only the size and complexity of a project, but the productivity of the vendor developing the software [30]. A planned, structured way of using metrics must also be practiced. References [8, 10-12, 14] noted that metrics can provide vital control information into a project's schedule, quality, and trouble spots, but are expensive in both collection and analysis; thus, they must show significant amounts of usefulness and be stated in the contract.

2.2.7 Future

Along with mitigation efforts, the future trends of software outsourcing tends to make outsourcing an easier choice over in-house development. The literature identified three future trends: 1) Application Service Providers (ASP) [[34, 35], 2) Partnerships [36], and 3) Knowledge Management [19, 32].

ASP's have become extremely popular in the software outsourcing world [34, 35]. In most cases, the provider supplied not only the software, but the service behind the

software such as, customer support, training, integration support, database access, internet access, backup services, recent software changes or version management, and server hardware support. It provided the customer the ability to lease the COTS product versus buying or building the software. Four drawbacks for buying/building software were summarized in Table 12.

Table 12 Buying/Building Software Drawbacks [35]

1. Development risk in building or customizing
2. Integration problems with other existing customer systems
3. New technology causes endless loops of software evolution meeting customer's need
4. Development or customization time is not fast enough

ASP had several benefits over buying/building software listed in Table 13 shown below:

Table 13 ASP Benefits [35]

1. 30% to 70% Cost savings due to the large number of ASP customers sharing the cost
2. Scalability based on customers' usage
3. ASP specific expertise offers faster software solutions to users
4. Promotes distributed/mobile workforce
5. Ensures customers have access to the best practices and usage of latest technology
6. Increases help support from other ASP subcontractors due to the importance of the large ASP's account to the subcontractors
7. Manages one ASP outsourcing relationship versus multiple outsourcing relationships with multiple vendors

Susarla [35] summarized the findings of an ASP survey including over 250 responses. The authors found that the biggest benefit dealt with speed of access, quality support, access to latest technology and processes, integration with other systems, and low cost. Many (51%) stated that they were up and fully operational in under a month. ASP's do have several drawbacks, as listed below in Table 14:

Table 14 ASP Drawbacks [35]

1. Not suitable for core (critical, unique) tasks (80%)
2. Non-customizable
3. Compared to a long successful custom built software lifetime, ASP cost can be higher
4. Dependent on oversight management to monitor performance and quality of service
5. Risk of interoperability with current core business practices

Several authors ASP articles included a list of cautionary items that should be taken prior to signing an ASP contract [34, 35]. These issues were summarized in Table 15.

Table 15 ASP Contract Issues [34, 35]

1. Performance and quality measures
2. Security guarantees
3. Backup/disaster guarantees
4. Legal support
5. Implementation plan
6. Required training and user support
7. A plan to back out and terminate service (data transfer)

According to Lee, the next evolution of software outsourcing focused on tightening the relationship into a partnership as illustrated in Figure 14 below [36]:

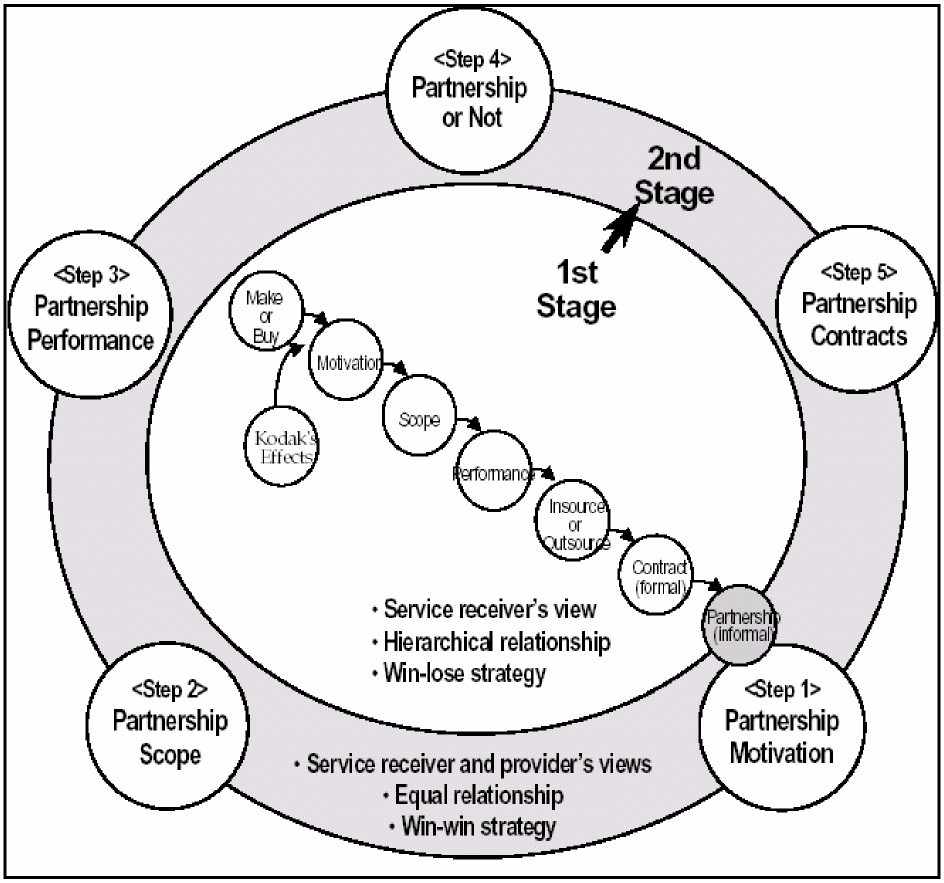


Figure 14 Partnerships [36]

Figure 14 showed that most current software outsourcing relationships were built upon the formal contract (win-lose) strategy. An outsourced vendor was paid even though the customer, caught on the losing end, found the delivered product worthless. In a partnership, the relationship was more tightly coupled. Many authors stated that outsourcing relationship was like a marriage making a partnership relationship like a marriage with kids. Both companies shared resources, personnel, risks, and confidential concerns. This relationship generated higher amounts of trust due to a win-win relationship, a relationship important for developing core type software [36]. Examples familiar to the AF included Federally Funded Research and Development Centers such as

Aerospace and Project Air Force (RAND) corporations. Both parties would be negatively impacted if the relationship fails as well as rewarded if the relationship prospers.

The final software outsourcing trend was identified as knowledge management [19, 32]. These articles continued with changing the view that software outsourcing was an acquisition of knowledge instead of a product. Improving business processes involved layers of various skill-sets connected by numerous communication channels. Software development took this same approach. The development normally implied an improvement of some business process. Such process meant knowledge must be captured, codified and evolved with management realigning their reasons for governing the outsourced vendor. The vendor was not just delivering software but added knowledge through the development of the software. This realignment affected vendor selection putting more emphasis on vendor's CMM level and making the vendor's methodology more important. The ability to attain knowledge from the documents and training was viewed as important as ensuring their quality. Other software outsourcing issues pushing knowledge management dealt with capturing and defining the processes used by software acquisition experts. With few true software acquisition experts, the ad hoc processes these individuals were captured and defined so that knowledge was transferred to the junior acquirers. In Nov 2001, DoD experienced its first federal acquisition team to achieve SA-CMM level two [26]. This team was the US Army Abrams Project Acquisition/Oversight team. Documenting the processes of how an

organization acquires software was an important step to the success of software outsourcing.

2.2.8 Software Outsourcing Topic Conclusion

As portrayed in the above graphs and figures, software outsourcing appears to be very complex. Numerous factors relating to consequences could not be explained in an easy formula. Given conflicts in the literature and rapid future changes in software outsourcing, literature research was simply not enough. Experienced insight proved important in capturing decision rationale which meant capturing the factors and goals for each project with the associated outcomes. From this experience, a standard practice of acquiring software development would emerge. Through analysis, outcomes could be measured in terms of doing worst, neutral or better given mitigation efforts and associated goals. In-house software expertise is required to support the acquisition/oversight team to eliminate reoccurring mistakes. This captured knowledge filtered out bad practices allowing only the proven, successful outsourcing methods to be kept.

2.3 Learning Mechanisms

Given the need to capture, codify and transfer software outsourcing decision-making knowledge, research offered two popular methods that were used to find significant relationship rules or patterns so that given enough analysis a model can be constructed. How these methods provide such information was quite different. Stepwise regression started with analysis to build an initial model along with the interacting data

affecting the outcome [37]. Data relating to this model was collected so that statistical analysis could be made to validate the relationships of the model. The second step involved adding and removing predictor variables according to the stepping criteria. The last step determined termination based on either the exhaustion of search possibilities of the stepping criteria or when desired performance had been reached. Stepwise was broken into two types of methods. The forward stepwise method was the process that started with the least number of effects in the model. Each effect was statistically tested against an entry statistic to see what effects could be added to the model. Immediately after all effects were added, a backward removal process was used to ensure that an effect could not be removed based upon a removal statistic. Backward stepwise method took an opposite approach. All effects were designed into the model at the beginning. Each was statistically tested against the removal statistic to decide which effects could be removed. After all selected variables were removed, a forward entry process was used to ensure that a variable could not be re-added based upon the entry statistic [37].

After the stepwise regression model was generated, two performance measurements were used to judge how the model related to a given set of observations. The first measurement, the correlation (R) value, focused on how well the model explained the variation within the observations. The second measurement, the Mean Squared Error (MSE), was used to determine the model's accuracy. MSE also referred to the amount of noise in the model. Both measurements were used together in explaining a model's performance [38].

Several authors stated NN took a completely different approach. It utilized patterns within the data in order for it to learn. Many definitions were offered in the field of computer science all sharing a common theme. This common theme considered NN as a patch work of many connected simple processors all with their independent amount of memory. These connections, considered as numeric weights, were used to carry input and output signals useful in predicting certain outcome patterns. NN could seek the advantage of each processor working in parallel with the other processors thus requiring a great deal of inner connectivity. However, it did not have to work in parallel given a simple NN model. Also, NN involved a training process (learning) where the connections and processors developed some learnt weights associated with input and output data that is being fed into it [39-42]. Figure 15 presented a visual diagram of two of the more common NN:

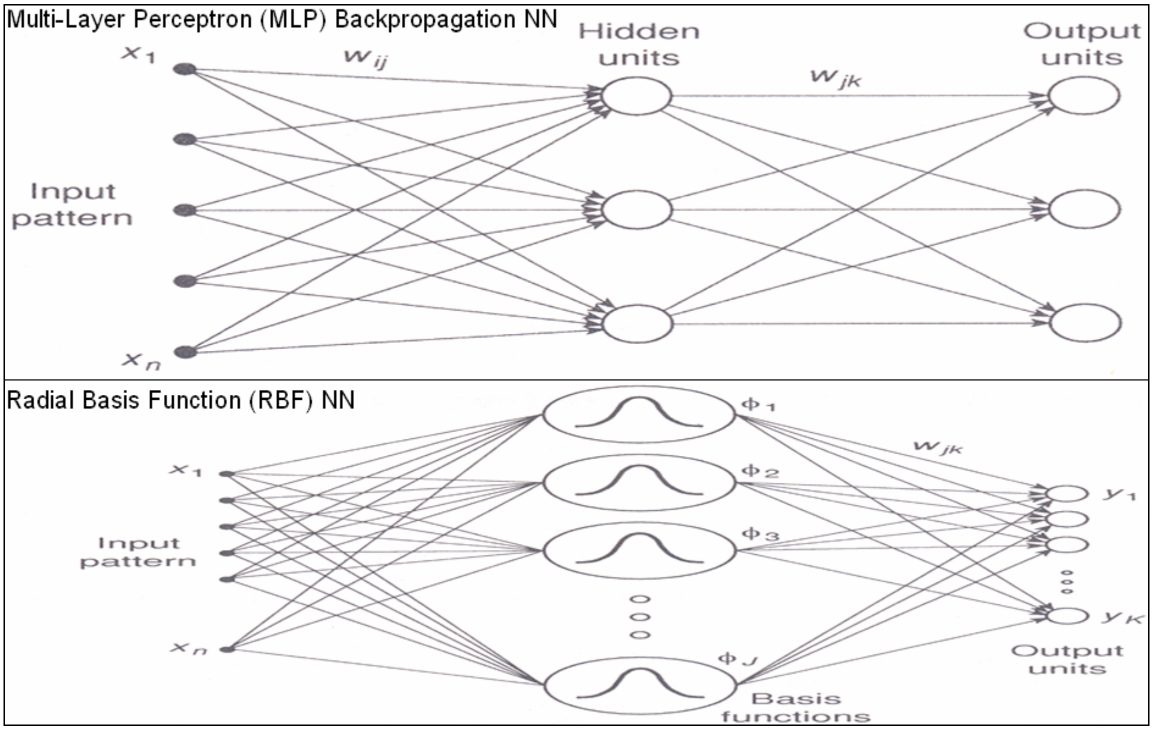


Figure 15 NN Visual Definition [39-42]

From this figure, the interconnecting processor acted upon the inputs and outputs that were fed into the NN. As the NN went through each input and output data set (patterns), the processors adjusted its weights accordingly not only to the current pattern but from the history of patterns recorded beforehand. This learning was broken into two categories: 1) Supervised learning - the target values and outputs were known. Both were fed into the NN during initial training so that the NN could establish weights matching its outputs with the inputs. 2) Unsupervised learning - the correct results were not known. The NN was fed with this unknown data. The NN would compress and cluster the data looking for connecting patterns. This type of learning was usually used for prediction type functions where the relationships were under study [39-42].

Another distinguishing NN category depended upon allowing learning cycles to develop within the NN [39, 41, 42]. If cycles were allowed, such that the output results were fed back as input, then the NN was classified as a feed-back NN. If cycles were not allowed the NN was classified as a feed-forward. This feed-back required a long amount of time before obtaining the desired learning performance measures. This drawback made training more complicated, but may be required given the type of data and the required accuracy of the NN [39, 41, 42]. Both methods, took advantage of historical data better known as backpropagation. This allowed the data to be introduced repeatedly into the NN. Upon each presentation, it fine tuned its associated weights corresponding to each pattern [42].

Authors stated that NN could be separated based on categorical or quantitative type input data. Categorical type data contained a finite number of possible values. Both supervised and unsupervised learning could be associated with categorical type outputs called classifications. Quantitative type data represented as numerical measurements that were associated with some arithmetic relation meaningful to the data and associated output [39, 41].

2.3.1 Neural Network History

Along with this definition, the NN history further introduced how NN had evolved [39, 42, 43]. NN existed before the 1950's. Relating it to only computer science, the first neuro-computer was built in 1954 by Marvin Minsky. In 1956, Dartmouth established a new research field of NN. Shortly after, in 1957, Frank Rosenblatt, with the support of Cornell University, demonstrated one of the earliest NN systems called the "Perceptron."

This system was capable of recognizing letters and received much attention until 1969 when the Minsky and Papert paper discussed the limitations associated with NN. Given this paper and the limits of computing power, research on NN came to a stand still for over a decade noted as the NN quiet years of ’69 to ‘82. During these quiet years, expert systems or rule based systems took center stage in the artificial intelligence world. Numerous expert systems were built trying to create a truly intelligent system. These expert systems tended to require large amounts of programming and memory to encapsulate the rules and decision making steps implementing those rules. Finally, in 1982, Lecun and Papert discovered “backpropagation” which went around the limitations discussed earlier in the 1969 paper. Immediate following this discovery, DARPA started to provide NN research funding, and in 1986, Rumelhart and McClelland published the “Parallel Distributed Processing” book. This book became the bible for which several other NN topologies were designed and built. Later in the 1980’s, Hecht-Nielsen released a paper that disproved the limitation associated in the 1969 paper, and the activity of NN has continued to grow since then [39, 42, 43].

2.3.2 Comparison Studies

Both NN and stepwise regression appeared to provide methods useful in capturing the software outsourcing decision making knowledge, but the question was does one method outperform the other method. Stepwise regression techniques were useful in creating a metamodel to describe simulation modeling as given by the [44] article. Both metamodel and simulation modeling were popular in the analysis of complex systems. However, simulation modeling involved a trial and error process in order to flush out

significant relationships used in predicting a set of outcomes. If the relationship did not meet the significant tests, the process was repeated until an accepted relationship was found. This iterative process was very time consuming and expensive [44].

To overcome this expense, simulation metamodels were used to establish relationship rules between inputs and outputs according to several sources, [37, 44-47]. These relationships could span over wide range of interests. Upon discovering and validating such relationship rules, an expert system could be created using such rules to solve or predict an outcome. Stepwise regression was one of the more common methods of flushing out such relationships based upon statistical analysis. Based on these relationships, a metamodel could be built to present how the relations between the significantly important variables interact to flush out certain outcomes [37, 44-47].

Both expert systems (built upon such relationship rules) and NN were used to approximate human decision making process, and in that respect, the two were similar. How they performed this approximation was different. Expert systems related to conventional data processing approach in that detailed programming logic must be used to evaluate the rules and associate the rules to the input data. This meant that the input must be complete and structured. This rigid environment often lost the accuracy because the decision making process involved a digital like yes or no results as it was calculated from predictable program logic. Thus, the weakness of the expert system was the rigid function and belief that the knowledge of the relationships could be effectively captured without loss of accuracy in the transformation. However, the knowledge of such rules

provided some insight to future learning and explanation of the problem being simulated [37, 39, 43-45, 48].

NN on the other hand was not a programmable set of rules. It learned from evaluating the input and output data; a process known as NN training. Given this dependence on the data and training, great care would be taken when collecting the data and using the data to train the NN. The NN key attributes were explained in Table 16.

Table 16 NN Key Attributes

1. Learning from experience: The input and output data would be considered the experience. Since the NN was data dependent, it used experience to make its choices [39-41, 43, 46, 47, 49, 50]. 2. Ability to generalize: Rigid dependence upon rules tended to be very specific and unforgiving. NN could take input data that was unfamiliar and make a general determination based off the experiences learned through training. As well as unfamiliar, this data could be incomplete or noisy (un-needed data that is not useful in making the decision) [39, 40, 43, 46, 47, 49, 50]. 3. Compute solutions faster: Having to based decisions upon large volumes of rules could be computationally intensive if not impossible. NN did not have to provide such a computational task because of its ability to use parallel processing between independent working neural processing models [39, 41, 43, 46, 50]. 4. Less reliance on the expert: Dependence on the rules meant dependence upon the expert or source of the rules. Sometimes this expert or rule discovery given such a number of variants was not available. Also, construction of those rules could be very demanding and tended to be very reliant on field experience. This construction could cause the introduction of various errors. NN was much more flexible providing decisions without such a heavy reliance on the rules. However, some domain expertise was required for choosing the correct neural network design and analyzing the input and output data [39-43, 46, 49, 50]. 5. Non-linearity: Development of rules that model non-linearity relationships were too complex. Behavior tended to be non-linear and related to experience which was how NN attained its decision making capability [39-43, 46, 47, 49, 50].

Tafti [43] contrasted the expert “rule based” decision making techniques with NN and found that both are needed. The shortcomings of one technique could be filled by the other. In several articles, both techniques were used to support each other. All authors

strongly encouraged domain and data analysis prior to the implementation of a NN solution [41, 43, 47, 49, 50]. Figure 16 summarized this NN and expert system comparison.

FEATURE	EXPERT SYSTEMS	NEURAL NETWORKS
Ability to handle fuzzy data	No	Yes
Capability of Providing explanations	High	Low
Learning by example	No	Yes
Self-adaptation to new situations	No	Yes
Programming effort	High	Low
Capability of processing large data	High	Low

Figure 16 NN vs. Expert Systems [43]

Several references introduced how both NN and stepwise regression techniques could be used together to build metamodels [44-46, 49]. The most popular metamodel technique was regression [43]. When an exhaustive amount of relationships, some possibly even hidden, NN was used to discover information needed in creating the metamodel. Stepwise regression then was used to validate this information. Constructing such a metamodel in this backwards approach captured the strengths of both techniques, but, this approach may introduce numerous errors transitioning from one technique to the other [44, 46]. A comparison was done comparing metamodels built by both techniques [44]. The modular function NN using the delta learning rules performed the best when compared to the following NN listed in Table 17:

Table 17 Comparison Study's NN [44]

▪ 3 General regression NN (each built with Projection, City Block and Euclidean summation) ▪ 3 Radial Basis Function (RBF) NN (each built with Projection, City Block and Euclidean summation) ▪ 4 Modular function NN (each built with Delta Rule, Delta Bar Delta, Quickprob and Maxprob learning rules) ▪ 4 Backpropagation NN (each built with Delta Rule, Delta Bar Delta, Quickprob and Maxprob learning rules) ▪ 1 Learning vector quantization NN (built with unsupervised learning Kohonen mapping)

In this study, each NN outperformed the stepwise regression model in almost every case. It was found that these summation functions do affect the outcomes in the general regression NN. Along the same lines, the modular function and backpropagation NN were found to be sensitive to the learning rule applied and the amount of training points used in training. The final finding showed the difference in training a NN needs in order to recognize quantitative vs. qualitative data. The report found that two separate NN metamodels would be needed depending upon the desired output data [44]. Also, in another similar test, the regression model was compared to NN model [49]. NN started to learn after 446 training patterns while the regression technique failed to even establish a relationship after 15000 training pattern sets [49]. Due to the nature of NN, it has several drawbacks. In Table 18, these drawbacks were summarized.

Table 18 NN Drawbacks

1. First drawback includes the complexities involved in training. It boils down to trial and error with a major reliance on experience, intuition and domain knowledge [41, 42, 44, 49].
2. Second drawback relates to deciding which inputs and output to use. Simplifying the network to only one output will tend to be faster, easier to debug, and to keep the amount of errors down [41, 42, 44, 49].
3. Third drawback deals with over-fitting and over-training of the NN. This overfitting deals with the complexity of associating weights to a wide range of variants. The number of hidden weights should be associated to the number of inputs and classes of those inputs used to train the network. Over-training is training the NN with too similar input and output training data. The noise of this similar data will be learned causing errors during the NN prediction process [[41, 42, 44, 49].
4. Fourth drawback is associated with its black box nature. The user accepts the output based on just the NN. Validation using stepwise regression is needed to associate the outputs into meaningful rules [37, 39, 43].

2.3.3 Neural Network Project Planning Concerns

Given these drawbacks, certain specialized software planning must be made when a NN is involved in a project. Differences that must be kept in mind when planning a NN software project vs. conventional software project were explained in Table 19.

Table 19 NN Project Differences [39]

1. NN project are data intrinsic. Analyzing and collecting the data needed to train the NN takes considerable amounts of experience, time, effort and resources.
2. Training of a NN boils down to trial and error. Building prototypes and experimenting with them provides the only assured way to specify the correct solution. This iterative trial and error process is hard to control thus increasing the risk for budget and schedule over-runs.
3. Main emphasis of a NN project is performance not speed of processing. Requirement specification should establish a minimum performance value. Additional emphasis should be spent on selecting a method used to validate and test these performance measures.

Several authors stated project planning should account for data collection, data analysis, prototyping, NN training, NN design and performance reviews, and performance

validation. Management must have different controls to allow for the iterative cycles required for trial and error of the NN. By using reviews, management can put some type of control on data, prototype cycle, and end of the prototype development phase. Reviews provided a way to align energies, effort and direction thus giving management visibility into the project which was critical to ensure the project is on time and within budget [39, 41].

The Figure 17 shows a typical NN software project life cycle:

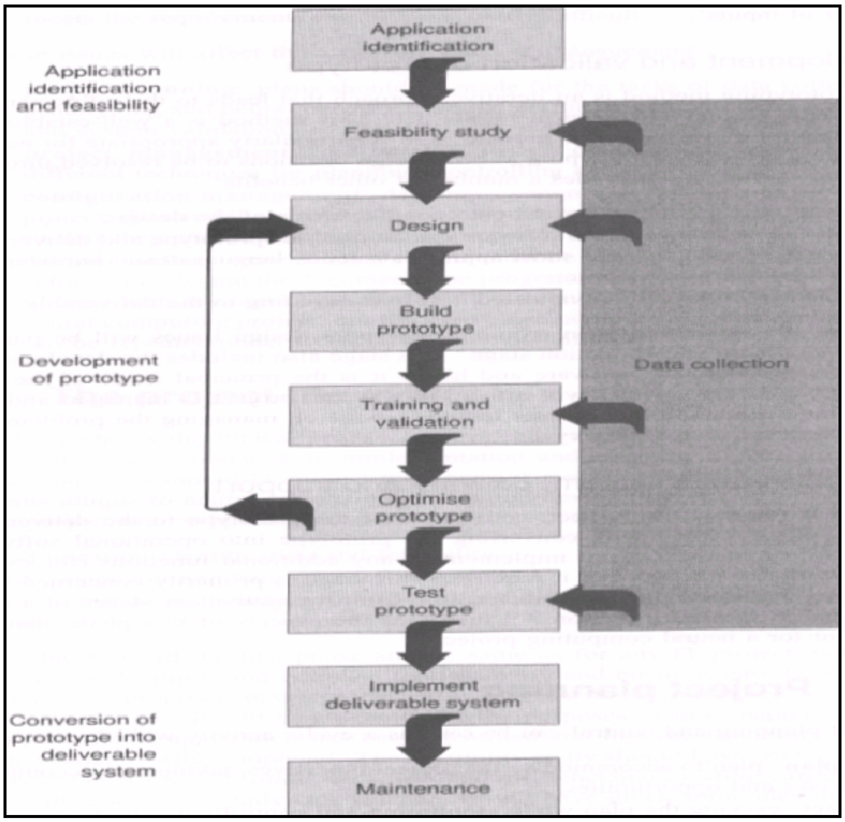


Figure 17 NN Software Lifecycle Model [39]

The project lifecycle was separated into three main phases: 1) application identification and feasibility study phase 2) development and validation of prototype phase 3) conversion of prototype into deliverable software system phase. Along with

these main phases, the supporting process of configuration management and documentation had their own respective NN issues. Configuration management issues were aimed at the ability of keeping the data, used during the training and validation phases, separated and backed up. Meta-information regarding the prototype must be kept separated upon each experiment and prototype cycle. Documentation issues dealt with knowledge transfer. The ability to repeat the NN trial and error experiment exactly under the same conditions was crucial. Results and details were recorded along with any rationale so that decisions could be made during development and maintenance phases [39, 41].

2.3.4 Neural Network Feasibility Concerns

In the first phase of the lifecycle, the application should lend itself to a NN solution. Given true, the second phase focused on the expense of such a solution by asking feasibility questions such as: Has another similar NN project been accomplished? Is the data required available? Do all the resources exist to collect and analyze this given data? Upon successfully answering such questions, business feasibility questions regarding cost, benefits, and risks were also addressed [39, 41].

Experience and published examples were extremely useful in deciding what applications lend toward a NN solution. Table 20 listed a small sample of applications where NN had proven quite effective:

Table 20 NN Application Examples

1. Prediction and classification problems using myeloma survival data [51]
2. Deciding factors for circuit soldering [47]
3. Predicting optimal termination of abrasive air flow machining in air intake manifolds [50]
4. Cost, bond rating, stock and current exchange estimation [39, 45]
5. Fault diagnosis, condition monitoring, forecasting, signal/image analysis, pattern detection, fraud inspection etc… [39, 40, 45, 48]

With each application example and future NN applications, three criteria were applied in order for NN to be considered as an appropriate solution for the project [39, 41]. These criteria were listed in Table 21:

Table 21 Required NN Criteria [39, 41]

1. The problem can not be defined within a simple set of equations or rules.
2. A relationship must exist between input and output data
3. Large amount of suitable data exist to train and test the NN

Along with these requirements, a feasibility study was performed to evaluate the cost of a NN solution with its benefits [39]. In project planning, it was necessary to understand the cost of the NN was more than other typical software projects. The time-cost to iteratively collect, analyze, train and test the prototypes made schedule control extremely difficult. The budget-cost found the same forecasting pressures as well. The additional cost of data collection and resources required in analyzing and training the NN had to be factored within such a budget [39].

As with any software project, sound software engineering principles demanded analysis of the benefits and risk mitigation. Benefits should outweigh the concerns of going forward with a NN project. Table 22 provided some common NN benefits.

Table 22 NN Benefits [39]

1.	Reduced staff cost
2.	Improved decision making
3.	Enhanced forecasting support
4.	Increased monitoring leading to better performance
5.	Improved fault detection
6.	Increased knowledge with proper analysis of results increased knowledge

On the sunrise of these benefits, beware of the storm clouds of the associated NN project risks. These risks included but were not limited to those risks listed in Table 23:

Table 23 NN Risks [39]

1.	Inability to get required performance
2.	Unavailable expertise to lead NN project
3.	Benefits blinds management feasibility study decision
4.	Resistance of those that refuse to support NN
5.	Inabilities to collect and analyze the data
6.	Increased development time
7.	Increased budget cost

The mitigation efforts to minimize these risks were found in one word, knowledge. Knowledge in literature, expertise and past solutions involving NN paid huge dividends in such mitigation efforts. Along with this knowledge, the application of sound software engineering processes increased the success of a software development project [39].

2.3.5 Neural Nework Data Concerns

From the lifecycle, it was obvious that data was a major part of the NN project. The whole push behind the NN solution was its capability to take different types of data from different sources, and through a process known as data fusion, produced the target output. This reliance on data was its main drawback because the NN will only be as good as the quality and appropriate quantity of data used to train it [39].

As stated in the above, the amount of training data could cause error-prone side affects known as over-fitting and over-training. One of the advantages of NN was its ability to make generalizations about input data to formulate a respective output, better known as extrapolating. In order for the NN to do this reliably, it must first interpolate its training data to a best fit curve or weighted system necessary to calculate a certain output. Through data analysis and stepwise regression models, an approximation could be made concerning the amount of weights needed to acquire a certain output. The number of training input sets should be of the same order of these weights. Other experts believed that the number of training sets should be of the same order as these weights divided by the accepted level of error. Given a 90% confidence level, the number of input sets would be the same order of these weights times 10. Because this approximation was not an exact science, iterative trial and error training prototyping was required to tune the NN [39, 45].

Another problem associated with data regards missing data which was common after data collection. Three methods were used to handle such a problem. The first method simply used the computed mean or median as a substitute for the missing value. The second method required capturing this missing data from its neighboring sets. It used its neighbor values to fill in the missing data. The last method actually used a NN or a step wise regression metamodel to predict the value. This could require extensive amount of work, but given the importance of the missing data, it might be required to minimize the error given such a substitution [39].

Ambiguous input data also appeared to cause errors if not identified and appropriately handled prior to training. This type of error resulted from the same input pattern matching two different outputs. Special allowances must be made to ensure this does not happen especially in training, validation and testing [39].

The type of NN also impacted training. In the comparison studies, it was shown the differences associated with the type of NN did affect the outcomes and accuracy of the NN [44]. Unsupervised NN, such as those using Kohonen mapping, did not require the extensive separation of the data into training, validation and testing sets. All of the collected data sets were used in training. Data analysis was still required for validation purposes. This analysis called for statistical techniques such as normalization methods and mean squared error methods.

However, supervised NN separated the data into various sets. Two of the most common supervised NN architectures were Multi-Layer Perceptron (MLP) (a class of backpropagation NN) and Radial Basis Function (RBF) NN. Each of these two architectures had several associated data concerns regarding each [39, 40, 42, 45].

RBF was unique because it involved unsupervised learning along with supervised learning. In the first phase, the unsupervised learning portion associated a selected basis function with an associated width. In the second phase, the supervised learning portion associated the outer layer weights to the identified patterns distinguished in the first phase. These outer layer weights gave the NN ability to label its results. Setting the weights was a linear task using such methods as the least mean square algorithm. There was no validation associated with RBF. RBF did have an advantage in that its hidden

layer was accessible; thus, test patterns could be executed to determine if the NN was interpolating vs. extrapolating. Training times were slightly shorter for RBF vs. MLP. MLP had a higher performance in generalization and classification abilities. Also, RBF was restricted to a small number of inputs which was another drawback [39, 40].

MLP (a backpropagation NN) showed to be one of the highest performing NN in the comparison studies [44]. This performance came at a price because validation and testing were both required. Four main tasks were associated for this type of NN and listed in Table 24:

Table 24 MLP NN Tasks [39, 40]

1. Partitioning the data into training, validation and test sets
2. Training the MLP until stopping criterion is met
3. Selecting the optimal network based on validity checks
4. Testing the trained network using the test set

Tarassenko [39] and Smith [40] insisted that multiple training runs must be executed against the NN. This was in part to its need for a random weight initialization. This randomization allowed the non-linear optimization of the associated weight sets. This initialization value was a small random number ranged from -0.01 to 0.01 and used to initialize each weight within the outer layer. As the network was iteratively trained, the weight sets adjusted appropriately. Upon each iteration, a validation or a stopping criterion was employed. As the training proceeded, the training error decreased while the NN accuracy increased, and the same was true for the validation error; up to an error validation minimum point. After this point, the validation error started increasing even though the training error showed that it was decreasing [39]. The following plot in Figure 18 illustrated this relationship between the training error and validation error:

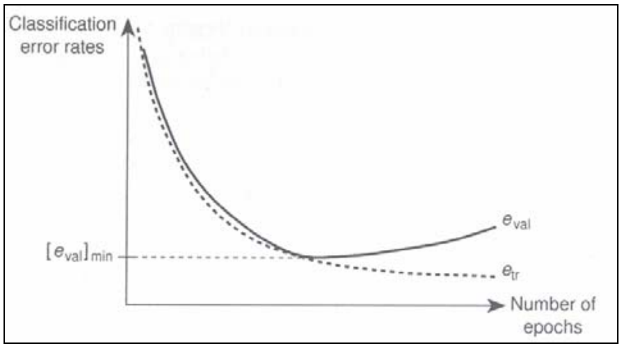


Figure 18 MLP NN Training Error Plot [39]

In Figure 18, an epoch was defined as the collection of all patterns given in the input data set. It could take hundreds of epochs for learning to occur. With each epoch, learning increased, much as a student preparing for a test might re-iterate through their study material. Learning stopped when the error validation minimum point had been reached as displayed in the above figure [39, 40].

Tarassenko introduced concerns about the amount of data. The amount of data used to train the MLP NN should be known because this same amount will need to be used to validate the NN and again used to test the NN. This 1:1:1 ratio was very demanding on the amount of data collected; therefore, other methods may need to be exercised when data is at a premium. One such method was known as cross-validation which maximized the amount of data used in the training process. The original collected data was split up several times. After these several splits, the training process was performed on each split. For each smaller split, a smaller test set was required to test thus allowing more data to be used for training. An example of this was given in Figure 19.

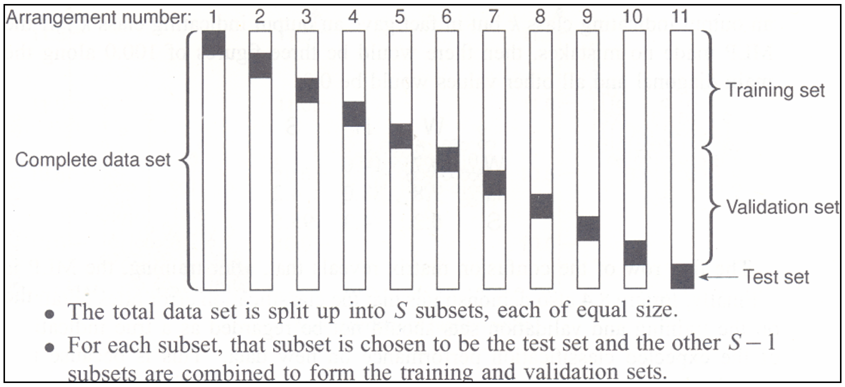


Figure 19 Cross-Validation [39]

Other common problems associated with training of NN were summarized in Table 25.

Table 25 Common NN Problems [39]

1. Incorrect NN solution due to no relationship between the input and output data
2. Incorrect features of the input data used to predict a certain output which could cause misleading results (another reason why stepwise regression can be used to support findings and in creating a metamodel)
3. Incorrect initialization values (setting them to close to 0 or 1)
4. Incorrect normalization of the input variables
5. Insufficient number of training patterns found in the input and output data. This causes generalization problems and could lead to misleading results
6. Incorrect usage of NN causes extrapolation vs. interpolation. This could happen when the NN was trained for predicting a certain window of outcomes, but someone tries to predict something outside the window.
7. Incorrect classification results due to unbalance data sets. Expertise is needed to analyze the data. Given only few patterns relating to one set of classification predictions and several patterns relating to another set of classification predictions could cause this type of problem.
8. Over-fitting and over-training problems, as previously discussed in the background section, cause poor learning performance. These two problems are the most common errors associated with NN. Proper analysis of the data and carefully following the training steps will prevent such problems.

2.3.6 Topic Conclusion

NN supported a variety of decision making type software. In some areas, NN were more accurate than a rule based system created from stepwise regression. Stepwise

regression assumed linear type relationship among a minimum number of co-linearity variables. As the complexity increased, as the number of variables and relationships rose, and as the relationship tended to become more non-linear, NN proved to be the best decision tool. However, the importance of analyzing and understanding the data was still required. This comparison showed that NN and stepwise techniques support each other to draw out and capture the knowledge needed to make future decisions.

2.4 Summary

Future software outsourcing decision making knowledge must be captured and modeled so that knowledge evolution can proceed aiding the AF in saving resources. In order to represent the complexity involved, the literature has given us several models to use. NN has been shown to be useful in supporting the rules associated with stepwise regression techniques. NN projects, however, also cause additional management, feasibility and data concerns. All must be successfully mitigated to ensure the software decision support tool takes proper advantage of both stepwise regression rules and NN.

3. Methodology

3.1 Introduction

This chapter discusses the methodology or plan for survey data analysis and building a software outsourcing decision support tool. In Chapter Two, it was discovered that software outsourcing was very complex along with numerous factors relating to its final consequences. The literature review showed many conflicts involving software outsourcing consequences such as reduced cost vs. increased cost, improved control vs. reduced control, and reduced schedule vs. increased schedule just to name a few. These conflicts were summarized in Chapter Two's Figure 1. This was mainly due to the fact of a rapidly changing software outsourcing world. Experience proved to be invaluable in guiding the outsourcing decision. Also, the literature research uncovered the fact that both regression and NN should be used together to support each other's weaknesses. The primary goal of this project involved taking both regression and NN methods and applying them to all of Hermann's survey data collected prior to 2004. These learning mechanisms captured the knowledge hidden deep within raw survey data. Such mechanisms provided the tool an efficient means for displaying this knowledge to those outsourcing decision makers seeking such support.

3.2 Previous Research

Much of this research and project planning was built upon previous work that was accomplished in Hermann's dissertation titled, "A Decision Tool to Support Strategy Selection for Software Development Outsourcing [11]." The product of this research was

a survey, analysis methodology, and a decision support tool called Software Outsourcing Decision Support tool version 1 (SODS1). This work was reviewed because much of the validation of the new tool, SODS2, rested on the validation of SODS1. Without such a solid foundation on which to build, this methodology would be severely weakened.

3.3 Research Activities

Given the foundation listed above, this section covers the methodology used in data analysis, creation of stepwise regression models, development of NN's, and development of SODS2. Tool selection will be the first area discussed. Once the reader understands how the tools are selected and evaluated, the new survey data transformation and analysis will be introduced. From the analysis section, the two learning mechanisms, linear regression and NN, are incorporated in this design for the creation of SODS2 outsourcing consequence regression models and NN's. Finally, the actual plans or designs for SODS2 are presented listing the software requirements that must be met to give the outsourcing decision maker a truly, high quality decision support tool.

3.3.1 Tool Selection and Evaluation

Using this foundation, several tools by default had to be used in the development of SODS2. MS Access was used to contain and organize the data and allowed Open DataBase Connectivity (ODBC) compatible software tools to access such data through SQL scripts. MS Outlook was used to collect the new online surveys.

Hermann made reference to a statistical tool called SPSS, "Statistical Package for the Social Sciences." Using this information, along with suggestions made by the AFIT

statistical department, JMP version 5.0 statistical tool was used in applying the same statistical methods that Hermann used with SPSS. The tool proved to be a good fit as it connected directly to the MS Access database. This tool also provided the implementation of T-tests and stepwise regression necessary to compare the results of research results with Hermann's previous results and for the creation of the consequence regression models. In this comparison, the tool's results were incorporated into MS Excel charts in a similar manner accomplished in Hermann's dissertation. These similar charts delivered the analytical overview required during implementation.

Researching the NN tool was accomplished in the same manner as the statistical tool. The evaluation criteria for this NN tool were based on availability and the tool's ability to provide 20, quality NN's that can be easily accessed by SODS2.

The first NN tool evaluated was Stuttgart NN Simulator (SNNS). To design, train, test and interface the NN's with SNNS, a large host of separate components were required; most of which were written for the UNIX platform. The next discouraging find dealt with the complex script language required for SNNS to interface with SODS2.

The next NN tool evaluated was Neurosolutions 4.0. It provided a graphical display from a main window that drove everything from designing, training, testing and interfacing the NN's. It was an all in one tool that had no compatibility issues running on the MS Window platform which made fielding SODS2 a much cleaner approach. Its two highest selling points included:

1. Interfacing was delivered through the use of Dynamic Link Library (DLL) files which again made fielding this application much easier, and

2. It came complete with an interactive learning demonstration, NN help manual, and an excellent technical support staff. This support staff provided this research NN expert guidance. The support staff made Neurosolutions the choice NN development tool for this research.

MS Access VB was used as the SODS2 developing tool largely due to the Neurosolutions tool. Java for Togethersoft was first conceived to be the tool of choice. Previous Java experience showed great interoperability with other components. Java was also proven to work well with ODBC application such as MS Access. Because Neurosolutions directly interfaced MS Access VB through the use of DLL files, Java was not needed. MS Access VB became the selected developmental tool because the data and application could be contained in an all-in-one database reducing the complexities involved in fielding the SODS2.

3.3.2 New Survey Data Transformation

As discussed in the tool selection section, MS Outlook was used convert all survey E-mail messages into one text file. Using Togethersoft, a Java applet was developed using common text file input/output and ODBC commands to automatically transfer the 48 text based surveys into 48 data rows accepted by the MS Access database. After the successful completion of this task, the new database should have a total of 135 rows of survey data with the first 87 rows comprising the old surveys collected before 2000 and used in SODS1 and with the last 48 rows comprising the new surveys collected after 2000.

3.3.3 New Survey Data Analysis

The new survey data was evaluated as it relates to the old survey data reported in the dissertation. In Chapter Two, 2.2.5 Outsourcing Survey, Hermann introduced many MS Excel charts and tables on outsourcing assertions, goal importance, goal realizations, and consequences all of which related to SODS1. In this research, these initial responses were compared to the old data to determine the amount of similarities and differences. The analysis included the following statistical comparisons: mean, standard deviation, variance, frequency diagram, and T-test at 95% confidence level. The exit criteria for this phase was the successful completion of this research's MS Excel charts to be used in comparing with those created in the dissertation work.

3.3.4 Regression Model Creation

Once the similarities and differences were attained, both the new, old and combined survey data were used in making SODS2 consequence regression models. It was first conceived that only the combined survey data models were going to be created, but analysis results showed greater than expected differences between the old and new data sets. SODS1 consisted of 20 consequence regression rules and was supported by an additional 14 goal realization regression rules. The modeling techniques exercised by this research was evaluated against Hermann's regression techniques. Both techniques used stepwise selection procedures with an entrance statistic of 95% confidence level and removal statistic of 90% confidence level [11]. The exit criterion for this evaluation was the validation of this research's modeling techniques.

After such validations were met, 14 regression models for the outsourcing goal realizations were created and analyzed for similarities and differences. Once satisfied with the analysis and realization model results, 60 regression consequence models (20 models created using the new data set, 20 models created using the old data set, and 20 models using the combined data set) were carefully designed in the same method used to create the 14 goal realization models with the exception of an extending stepwise entry / removal statistics. It was first conceived that the same stepwise statistics used in Hermann's models would suffice, but during the analysis of the goal realization models, stepwise current configuration settings were not allowing the removal of any model input variables. Extending both the entrance statistic and removal statistic to 75% showed great results in the number of input variables allowed to be inserted into the model and the number of input variables that were first inserted and then removed from the model. This special attention to detail in building the outsourcing consequence models was significant because these 60 models were actually encoded into SODS2 having a direct affect on the output of the tool. Due to this importance, analyzing such differences and similarities not only validated a seamless transition from SODS1 to SODS2, but laid forth a means of allowing the outsourcing knowledge contained within the models to evolve.

3.3.5 NN Development

Chapter Two discussed differences between learning mechanisms based on regression models and NN's. It was discovered both are needed for this application's complete development. Also from Chapter Two, Multi-Layer Perceptron (MLP) with backpropagation and Radial Based Function (RBF) NN were found to be the most

popular. The MLP with the delta learning rules showed to have great promise. Its main drawback was the amount of data required for training, cross validating, and testing. RBF showed promise because it did not need to set additional data aside for cross validation [44]. As a result of these finding in literature, MLP was selected to be the primary option, and given any problems with not enough data, RBF would be a backup plan.

Neurosolutions tool selection was a major portion of this NN development. This research started out with very limited NN development experience. Neurosolutions demonstration, user manual, and support staff provided this research the NN design, training, testing and interfacing results recorded in Chapter Four. The exit criterion for this phase was the successful creation of 20, consequence NN's built to some degree of accuracy and capable of being interfaced by SODS2 during runtime.

3.3.6 SODS2 Development

Along with the new, complete survey database, SODS2 was created in MS Access VB. Neurosolutions provided this development tool a working sample showing how this application would interconnect SODS2 with the 20 NN's explained above. This was the cornerstone for using both Neurosolutions and MS Access together in building this application. SODS2 will need to meet several requirements listed in Table 26 below:

Table 26 SODS2 High Level Requirements

1. SODS2 will be user friendly with windows and point and click commands
2. SODS2 will allow the user to input all 38 input flags
3. SODS2 will output any of the 20 outsourcing consequences in an understandable report
4. SODS2 will allow the user to select a desired learning mechanism: NN or regression model
5. SODS2 will contain the learning logic behind the 60 regression models
6. SODS2 will interface with 20 NN by passing 38 inputs and receiving the selected consequence output
7. SODS2 will output an assertion report based on the user's outsourcing projects input
8. SODS2 will allow all reports to be printed and saved as a text file
9. SODS2 will provide instructions and help tags whenever deemed necessary

SODS2 was validated through the usage of several scenarios created directly from surveys collected after this implementation. These surveys were not used in the analysis or regression / NN creation; therefore are completely new to such research. Each new survey provided several scenarios matching the NN and regression estimated output against the actual survey outcome. The exit criteria for the SODS2 development phase was the collection of the validation results.

3.4 Summary

This chapter described the methodology for supporting, designing, building and testing SODS2. Key principles discussed in Chapter Two were used to create this research methodology and SODS2 design. Much of the validation from Hermann's work was implicitly inherited into SODS2. Since SODS2 was built upon the latest survey data using both regression models and NN learning mechanisms, more accurate information was available to the software outsourcing decision makers.

4. Implementation Results

4.1 Introduction

In Chapter Three, a methodology for analyzing the data, creating the regression models and NN, and development of SODS2 was presented. This chapter presents the outcomes of the aforementioned effort. During these results, the methodology changes documented in Chapter Three will be clearly brought forward showing the additional support associated with each change. Chapter Three also discussed the baseline from which this work was being built upon. This baseline remains unchanged and is the initial starting point for this chapter.

4.2 Survey Data Transition

As stated above and in Chapter Three, the new survey data was collected through E-mail messages. The old survey was organized neatly in a MS Access database. The goal for this implementation phase was to transition the data from the E-mail messages to the database. MS Outlook was first used to convert the 48 new survey data E-mail messages down to one complete text file. Outlook allowed multiple selections of all these messages and the "saved as text" function to convert such selected E-mail messages as one text file. The next step was to convert the text file to database records. A small program was written using Java Togethersoft to provide the logic and ODBC connectivity needed to complete this task. An ODBC data source for the database was created using MS Windows operating system. The Java ODBC recognized this data source and gave the program connectivity to the database by means of SQL.

Transitioning the text data into acceptable MS Access data elements was more challenging. Several string parsers and associated logic were designed and tested to move the data over from string data types to integer data types. Upon successful type conversion, a host of input SQL commands were developed and tested to finally convert the readable survey data into database records. The phase drew successful conclusion with a new database containing the 48 new survey responses along with the 87 previous survey responses.

4.3 Survey Data Analysis

This phase concentrated on analyzing the new survey data, now stored in the database, against earlier survey data. The purpose of this analysis was to determine if the new survey data was significantly different from the earlier responses.

4.3.1 Outsourcing Experience Analysis

Using JMP 5.0, the outsourcing experience data was analyzed first to summarize the difference between the amount of respondent's software development outsourcing between the new and old data. The old survey outsourcing experience statistics were shown in Figure 20:

	Number of Projects per Respondent	Percent of Outsourcing within Respondent Organization
Mean	5.5132	26.6753
Median	3.0000	10.0000
Mode	2.00	.00
Std. Deviation	7.0569	31.6712

Figure 20 Old Survey Data Outsourcing Experience [11]

The new outsourcing experience was listed below in Table 27:

Table 27 New Survey Data Outsourcing Experience

	Number of Software Outsourcing Projects per Respondent	Percentage of Software Outsourcing Practiced by Respondent's Organization
Mean	7.27	38.34
Median	5	30
Standard Deviation	6.48	27.16
Standard Error	0.72	4.40

The new data showed that recent respondents were using outsourcing significantly more than previous organizations. Such results identified, according to the new survey data, that software outsourcing's popularity and positive results were growing. The results also indicate the new survey results were built on more outsourcing experience than those previously captured. This was a harbinger of good data quality.

4.3.2 Outsourcing Project Assertion Analysis

In Hermann's dissertation, a percentage chart was used to summarize outsourcing assertion data. This chart was reproduced in the same manner except showing the new survey data analysis. The survey asked for a variety of assertion questions regarding outsourcing projects. The purpose of these questions was to distinguish methods or assertions believed to help make the outsourced project a success. Responses ranged from 1, "strongly disagree", to 5 "strongly agree." The chart simplified the response by converting responses 1-2 to mean "agree", 3 to mean "neutral", and 4-5 to mean "disagree." For a more in depth explanation of each assertion, please refer to Appendix G. The following subsections will analyze each type of assertions.

4.3.2.1 Outsourcing Project Assertion Analysis

Project assertions were methods set toward improving outsourced project as a whole regardless of outsourced strategy. The following Figure 21 summarized the project type assertions for the old data:

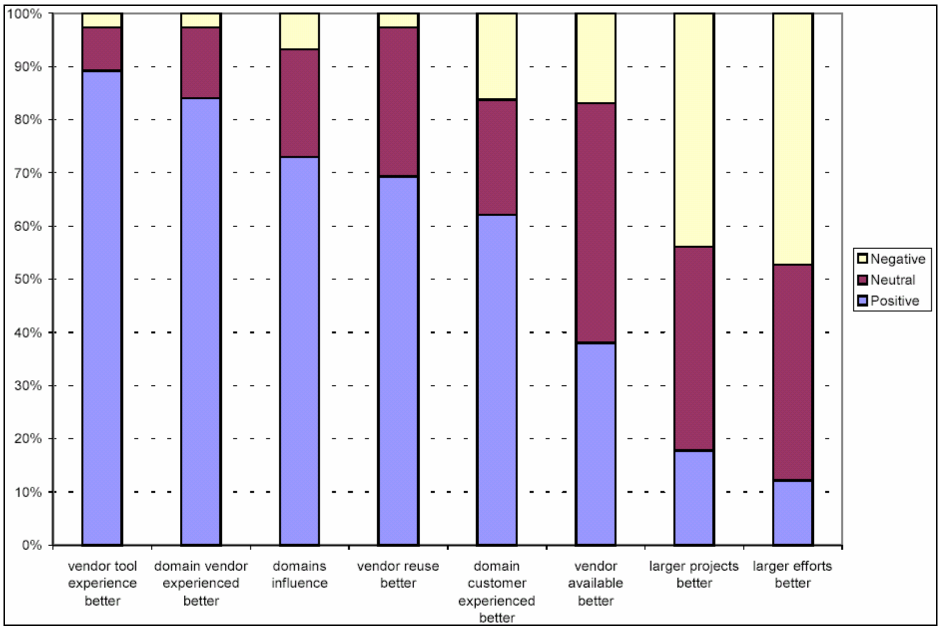


Figure 21 Old Survey Data Project Assertion Analysis [11]

The new survey data project assertion analysis was listed below in Figure 22:

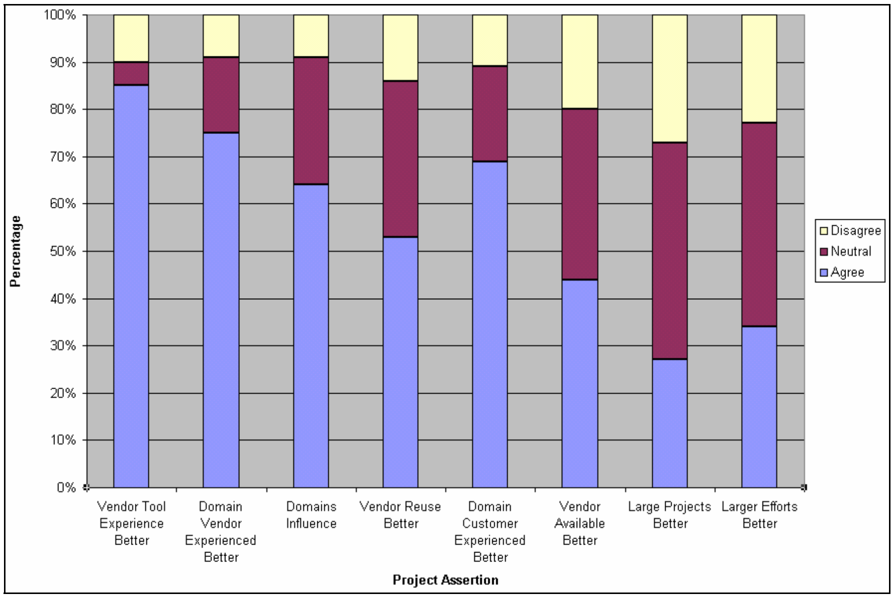


Figure 22 New Survey Data Project Assertion Analysis

The results were similar with the exception of the larger project and effort assertions. The new data showed the respondents were neutral with no clear tendency going either way on those two assertions. A possible explanation for this result could lie with project outsourcing management. Maybe new outsourcing management techniques were allowing software outsourcing success for larger projects and efforts. However, since this analysis showed these two assertions as neutral, they were left out of SODS2.

4.3.2.2 Outsourcing Relationship Assertion Analysis

Relationship assertions were methods set toward improving buyer / vendor relationship and much like the project assertions affected the outsourced project as a whole regardless of the outsourced strategy. Figure 23 summarized the relationship assertions for the old data:

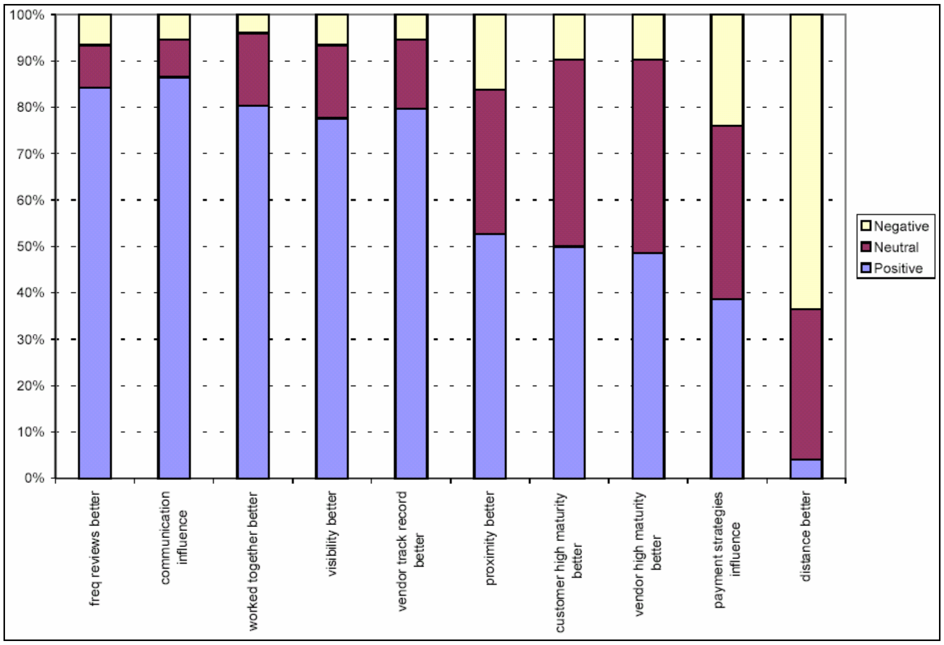


Figure 23 Old Survey Data Relationship Assertion Analysis [11]

The new survey data relationship assertion analysis was listed below in Figure 24:

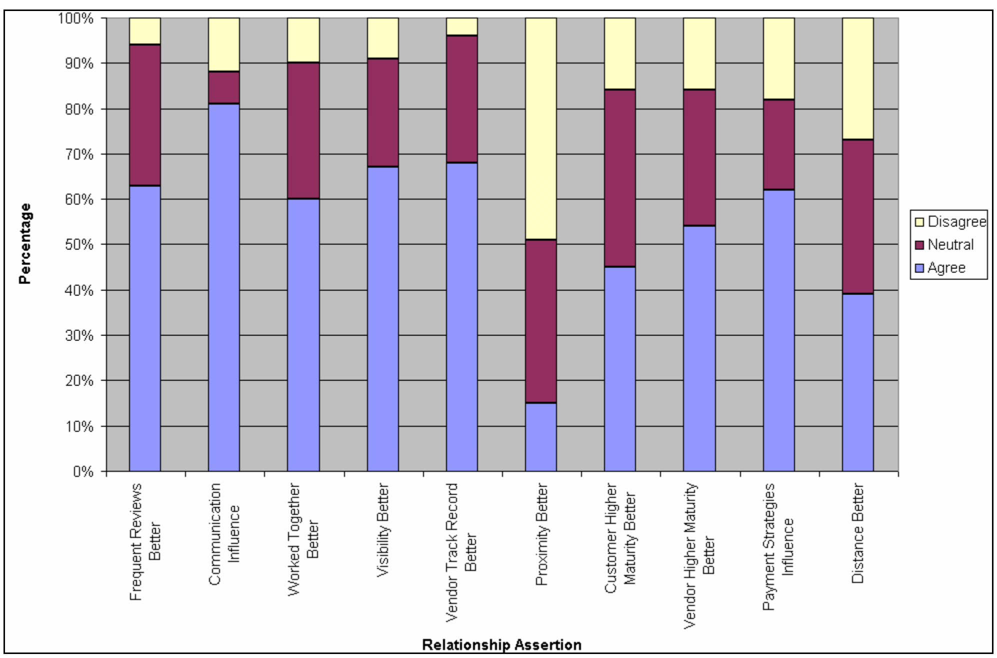


Figure 24 New Survey Data Project Assertion Analysis

The results showed a decrease in every outsourcing relationship assertion. However, only proximity and distance assertions failed to be consistent with the results captured in the old data. Both of these assertions involved distances between the buyer and vendor. Proximity referred to the buyer and vendor being located within small distances while the distance assertion referred to the increased worked day due to the distances separating the buyer and vendor. Respondents felt that proximity was a factor in outsourcing success which was completely reversed in the old data. The distance assertion received a mixed reaction in the new data. Thus, this assertion was virtually neutral when compared to significant disagreement from the initial research. A possible explanation for both results could lie with the increase in communication tools making it possible to have a virtual face to face meeting over the internet and ability to communicate software development information needed by a software outsourcing project. Since there was no clear alternative for the proximity assertion and the mixed reaction regarding the distance assertion, both assertions were removed from SODS2.

4.3.2.3 Outsourcing Project Goal Assertion Analysis

Project goal assertions were methods set toward improving outsourcing goals and much like the project assertions affected the outsourced project as a whole. Figure 25 summarized the project goal type assertions for the old data:

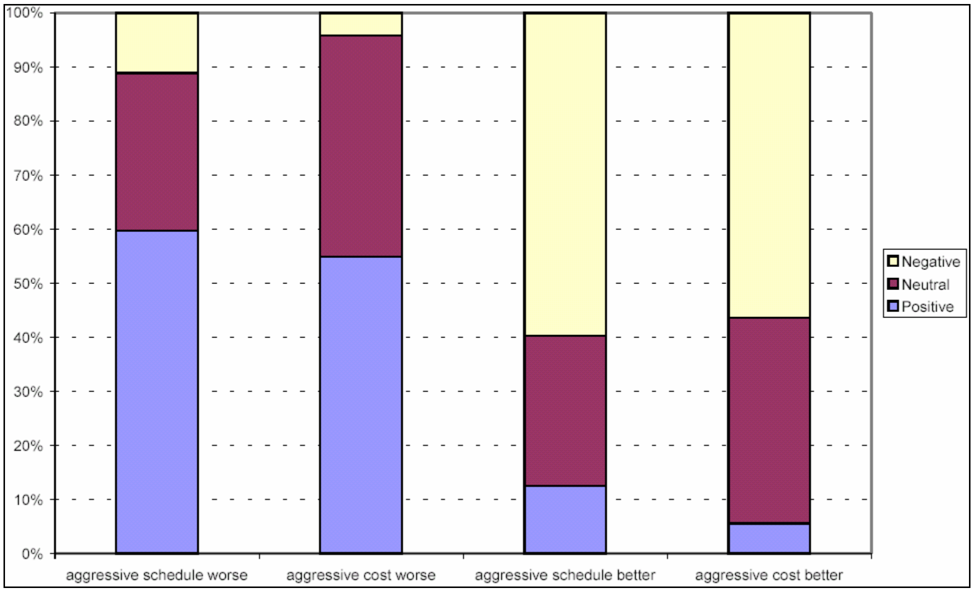


Figure 25 Old Survey Data Project Goal Assertion Analysis [11]

The new survey data project goal assertion analysis was listed below in Figure 26:

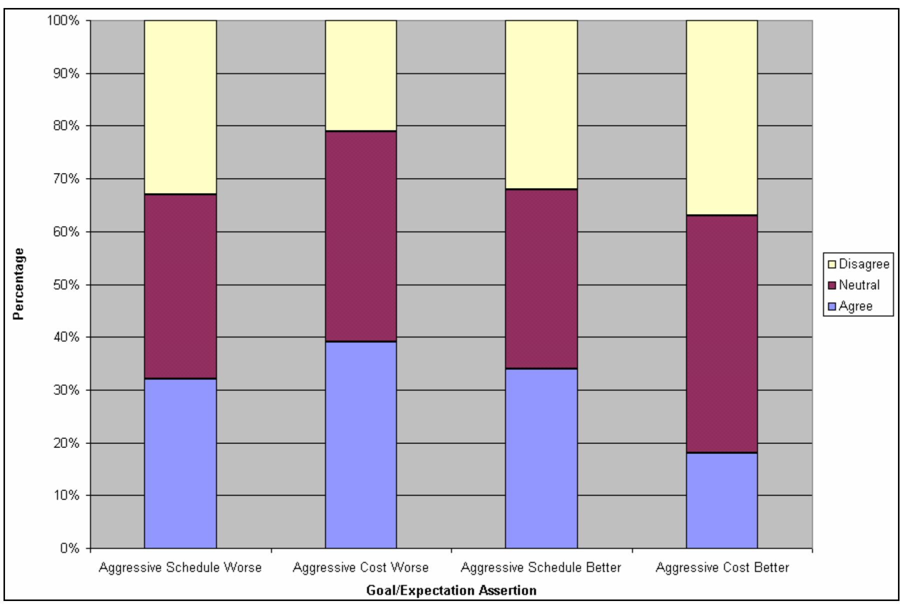


Figure 26 New Survey Data Project Goal Assertion Analysis

The results were somewhat different. The new data showed more varying opinion regarding project goal assertions. The new data respondents saw aggressive cost project goals as a bad influence on outsourcing success by a two to one margin. However, they

had no clear tendencies regarding aggressive schedule project goals. This trend should be investigated to determine if software outsourcing was starting to offer more schedule flexibility. As a result, aggressive schedule project goal assertion was left out of SODS2.

4.3.2.4 Outsourcing Process Assertion Analysis

Process assertions were methods set toward improving outsourcing where process outsourcing strategy was being practiced. These assertions were aimed at the interactions between in-house and outsourced processes. Figure 27 summarized the process type assertions for the old data:

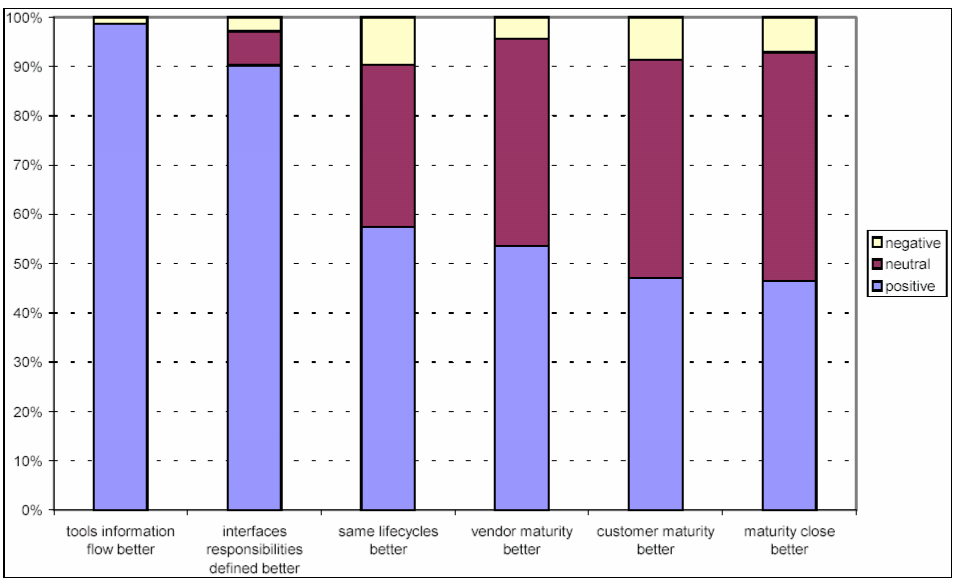


Figure 27 Old Survey Data Process Assertion Analysis [11]

The new survey data process assertion analysis was listed below in Figure 28:

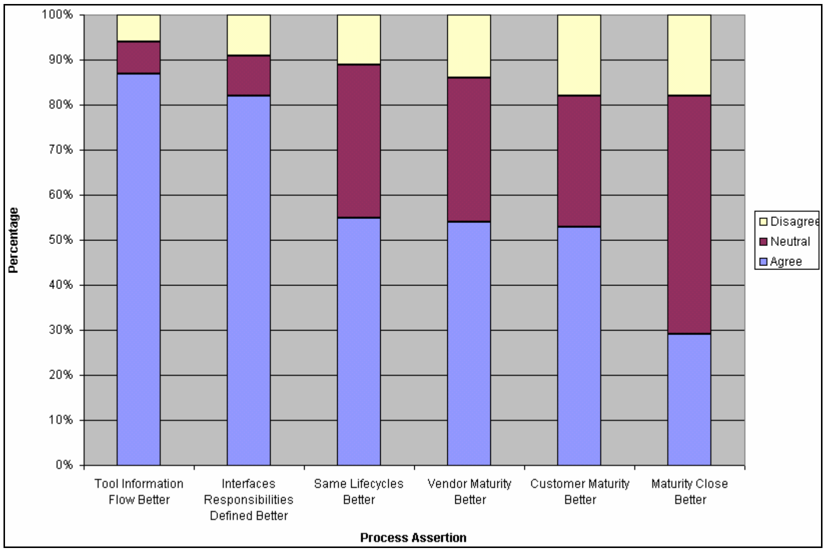


Figure 28 New Survey Data Process Assertion Analysis

The results were very similar. Having a comparable maturity levels between vendor and customer showed a decrease, but with a near to two to one ratio, this assertion will remain unchanged. Since this analysis showed similar results, all process type assertions were included in SODS2.

4.3.2.5 Outsourcing Product Assertion Analysis

Product assertions were methods set toward improving outsourcing success where product outsourcing strategy was being practiced. These assertions were aimed at the outsourced development of a product or sub-product. Figure 29 summarized the product type assertions for the old data:

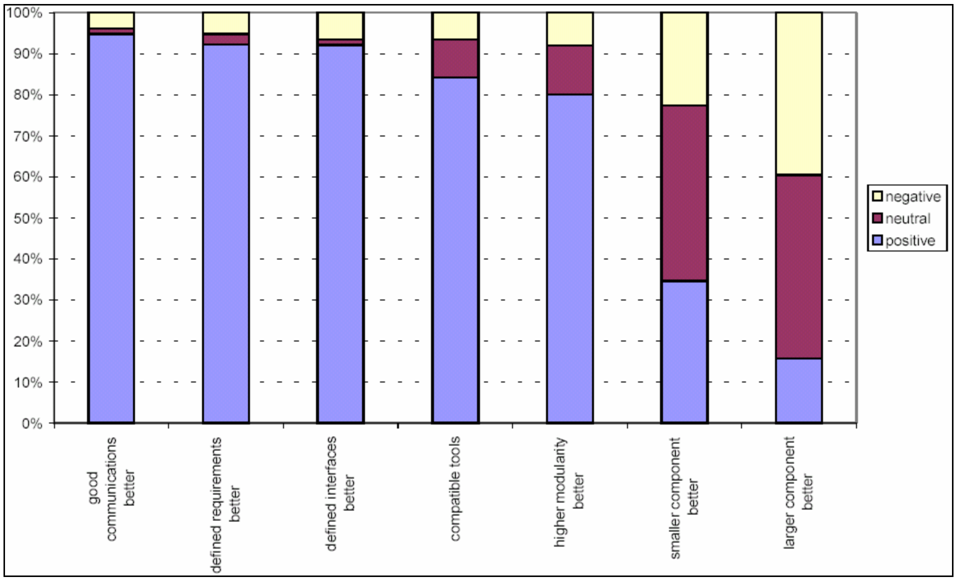


Figure 29 Old Survey Data Product Assertion Analysis [11]

The new survey data product assertion analysis was listed below in Figure 30:

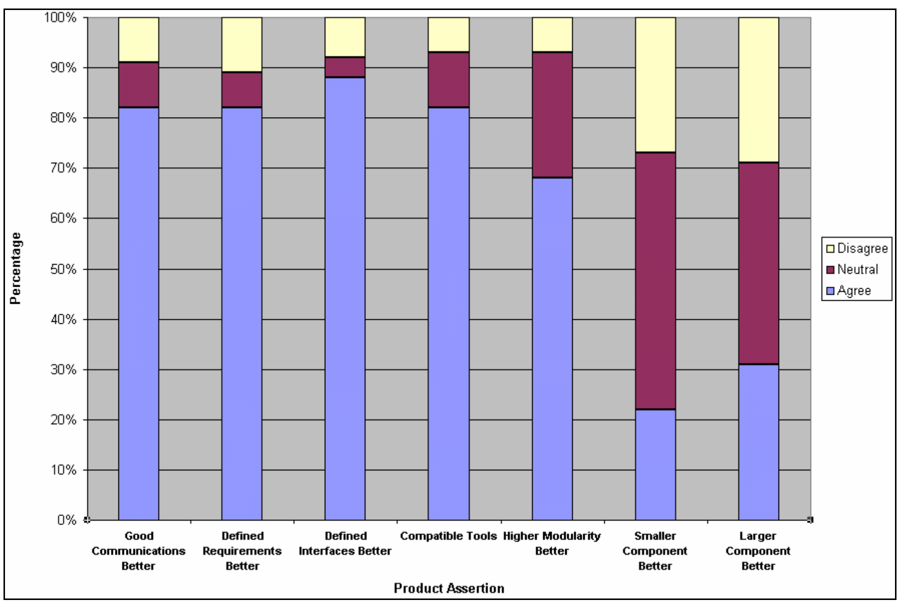


Figure 30 New Survey Data Product Assertion Analysis

The results were very similar. Only the product size assertions showed no true tendency. As a result, these two product assertions were not included in SODS2.

4.3.2.6 Outsourcing Product Related Assertion Analysis

Product goal assertions were methods set toward improving outsourcing goals where product outsourcing strategy was being practiced. These assertions were aimed at the outsourced development of a product or sub-product. Figure 31 summarized the product related type assertions for the old data:

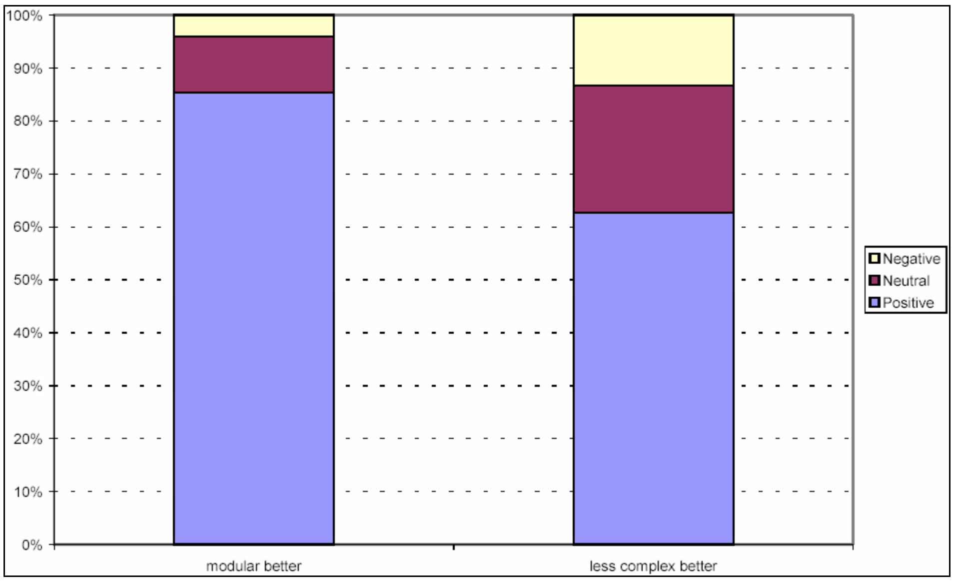


Figure 31 Old Survey Data Product Related Assertion Analysis [11]

The new survey data product related assertion analysis was listed below in Figure 32:

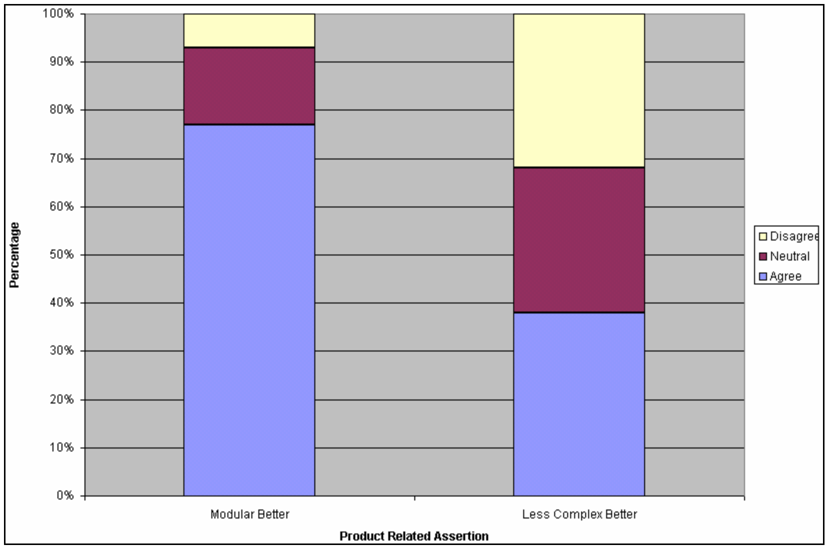


Figure 32 New Survey Data Product Related Assertion Analysis

The results were somewhat different. The new data showed the respondents were neutral on complexity assertion, but the modularity assertion remained the same. As a result, the complexity assertion was left out of SODS2.

4.3.3 Outsourcing Goal Importance Analysis

The next type of data analyzed was the importance of outsourcing goals. Each respondent was asked for input regarding the importance of 14 possible outsourcing goals. The mean, median, standard deviation and error were important, but using these statistics alone could misconstrue the true results. Fourteen statistical T-test at the 95% confidence level were used in order to show the importance of these goals. This testing method accounted for the difference in the samples distribution as well as the mean value. The response scale from this question ranged from 1, “Not Important”, to 5, “Very Important.” Figure 33 shows the values captured from Hermann’s analysis of the old data:

Goal	Importance
Acquire Expertise not Available In-house	3.61
Reduce Schedule (Vendor Faster)	3.30
Improve Responsiveness to Organizational Objectives	3.29
Improve Responsiveness to Customer Objectives	3.21
Add People (insufficient in-house capacity)	3.15
Improve Product Quality	3.10
Reduce Schedule (through parallel activities)	3.06
Improve Control over Project Management	2.75
Non-Core Activities	2.63
Add People (short-term)	2.54
Reduce Cost (via economies of scale)	2.54
Keep Staffing Levels Stable	2.48
Risk Sharing	2.35
Cash Flow from Sale of Product Rights	1.49

Figure 33 Old Survey Data Outsourcing Goal Importance [11]

From Figure 33, each goal importance was ordered from those with the highest mean importance to the lowest. The last three goals, highlighted at the bottom, signified these goals were significantly less than neutral. Figure 34 showed the values captured from statistical analysis of the new data:

Null Hypothesis - Ho: Sample Mean = Neutral
Alternate Hypothesis - Ha: Sample Mean > Neutral (95% CI)

Goal	Importance (sample mean)	P-Val (chance importance = neutral)	T-Ratio (test prob of importance = neutral)	Z(alpha = .05) (critical point) T-dist (degrees of freedom ~ 100)	Rank	Old Rank
Reduce Schedule (To Vendor Faster)	3.89	~ 0%	5.80	1.69	1	4
Improve Responsiveness to Organizational Objectives	3.79	~ 0%	4.32	1.69	2	1
Reduce Cost (via economies of scale)	3.82	.01%	4.08	1.69	3	12
Improve Quality of Software Product	3.77	.05%	3.76	1.69	4	5
Improve Control over software development	3.79	.08%	3.62	1.69	5	8
Improve Responsiveness to Customer Objectives	3.63	.6%	2.91	1.69	6	3
Add People (Capacity)	3.58	.9%	2.72	1.69	7	6
Reduce Schedule (Outsourcing Parallel Activities)	3.49	2%	2.32	1.69	8	7
Keep Staffing Levels Stable	3.42	5%	2.01	1.69	9	11
Risk Sharing	3.43	6%	1.96	1.69	10	13
Acquire Expertise Not Available In-House	3.25	31%	1.02	1.69	11	2
Non Core Activities (allows focus on core activities)	3.14	57%	.58	1.69	12	9
Add People (Short Term)	3.05	82%	.23	1.69	13	10
Cash Flow from Sale of Product Rights	2.33	.83%	-2.78	1.69	14	14

Notes:
White: Those goals that rejected Ho in favor of Ha (importance greater than neutral)
Light Blue: Those goals that failed to reject Ho of being equal to neutral (importance is considered neutral)
Grey: Cash flow from sale of product rights tend to be significantly not important (importance less than neutral)

Figure 34 New Survey Data Outsourcing Goal Importance

The 14 T-tests indicated some significant differences between the new and old data. The new data showed an increase in the mean importance with each goal except for acquiring expertise. This could indicate that more companies now find it easier to

acquire software expertise than did their counterparts in the original study. Another interpretation of this reduce cost difference was the increased competitive nature of today's software industry. During the technology boom of the late 1990's, acquiring software expertise drove outsourcing development. With more software outsourcing corporations capable of such development, buyers are now focusing on reducing the cost to keep up with this competition.

4.3.4 Outsourcing Goal Realization Analysis

The next step was to analyze the realization of the outsourcing goals described above. Each respondent was asked for input regarding the satisfaction or realization of those 14 goals. Again the mean, median, standard deviation and error were important, but statistics had to be validated with T-tests to show if these goals were meeting the respondent's expectations. The T-test guarded against having bad results due to varying responses. The response scale from this question ranged from 1, "Significantly Worse Than Expectations", to 5, "Significantly Better Than Expectations." The middle response of 3 would indicate that software outsourcing was right on target so anything greater than 3 would signify outsourcing success while those lower than 3 would show outsourcing failure to meet those goals. Figure 35 showed the values captured from the old data:

Goal	Result Mean	Percentage of Positive Responses
Acquire Expertise not Available In-house	3.14	79%
Non-Core Activities	3.08	83%
Add People (insufficient in-house capacity)	3.06	81%
Add People (short-term)	2.93	83%
Keep Staffing Levels Stable	2.93	83%
Improve Responsiveness to Organizational Objectives	2.71	62%
Improve Responsiveness to Customer Objectives	2.65	59%
Risk Sharing	2.65	67%
Improve Product Quality	2.63	66%
Cash Flow from Sale of Product Rights	2.70	74%
Reduce Schedule (through parallel activities)	2.54	43%
Improve Control over Project Management	2.54	57%
Reduce Cost (via economies of scale)	2.54	57%
Reduce Schedule (Vendor Faster)	2.42	48%

Figure 35 Old Survey Data Outsourcing Goal Satisfaction [11]

From Figure 35, each goal satisfaction was ordered from those with the highest mean satisfaction to the lowest. Those goals highlighted in yellow indicated those goals found through T-testing to be equivalent to 3 or "right on target." The last five goals in white signified the goals not found to be equivalent to 3 hence not "right on target." Figure 36 showed the analysis of the new goals satisfaction data:

Null Hypothesis - Ho: Sample Mean = Neutral
Alternate Hypothesis - Ha: Sample Mean <> Neutral (95% CI)

Goal	Importance (sample mean)	Percent of positive responses	P-Val (chance of being right on target)	T-Ratio (test prob of being right on target)	Z(alpha/2 = .025) critical point T-dist (degrees of freedom ~ 100)	Old Mean	Mean Diff.
Add People (Capacity)	3.21	87%	20%	1.31	2.02	3.06	0.15
Improve Quality of Software Product	3.16	81%	30%	1.04	2.02	2.63	0.53
Keep Staffing Levels Stable	3.16	86%	31%	1.02	2.02	2.93	0.23
Improve Responsiveness to Organizational Objectives	3.15	76%	43%	.80	2.02	2.71	0.44
Reduce Schedule (Outsourcing Parallel Activities)	3.14	77%	41%	.83	2.02	2.54	0.60
Improve Responsiveness to Customer Objectives	3.10	78%	58%	.56	2.02	2.65	0.45
Reduce Cost (via economies of scale)	3.07	72%	69%	.40	2.02	2.54	0.53
Risk Sharing	3.00	76%	~ 100%	~ 0	2.02	2.65	0.35
Improve Control over software development	2.79	62%	25%	-1.18	2.02	2.54	0.25
Reduce Schedule (To Vendor Faster)	2.78	64%	17%	-1.40	2.02	2.42	0.36
Acquire Expertise Not Available In-House	3.26	84%	14%	1.50	2.02	3.14	0.12
Non Core Activities (allows focus on core activities)	3.03	83%	86%	.18	2.02	3.08	-0.05
Add People (Short Term)	2.97	76%	86%	-.18	2.02	2.93	0.04
Cash Flow from Sale of Product Rights	2.81	76%	18%	-1.36	2.02	2.70	0.11

Notes:
White: Indicates those important goals that are right on target
Light Blue & Grey (* Ranking): Indicates those goals that lack importance

Figure 36 New Survey Data Outsourcing Goal Satisfaction

The new goal satisfaction report indicated numerous differences between the new and old data. The new data showed an increase in every goal satisfaction except for reducing non-core activities. Reducing schedule, improving quality, reducing cost, and increasing responsiveness to both customer and organizations had significant increases from 0.60 to 0.44 respectively. These improvements were even more notable since those same goals were the top five goals in terms of importance. With such significant differences between the new and old responses, the author realized they represented different populations and would likely produce different outsourcing consequences.

4.3.5 Outsourcing Consequences Analysis

Outsourcing consequences captured the overall outcome of outsourcing given the respondent's experience. Figure 37 summarized the outsourcing consequences for the old data:

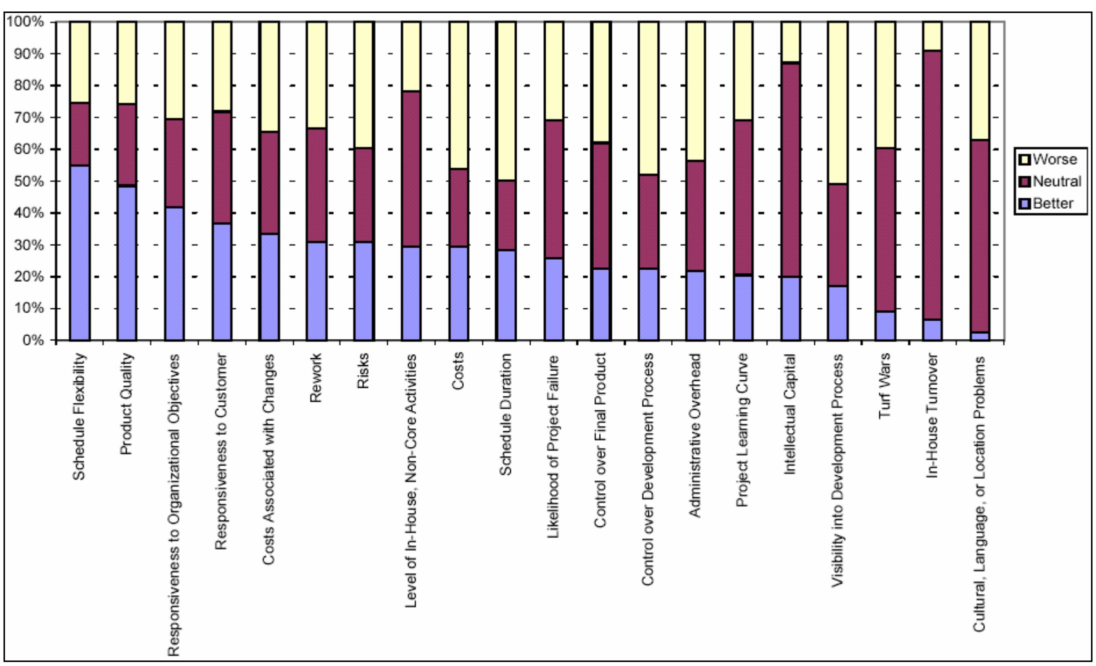


Figure 37 Old Survey Data Consequence Analysis [11]

The new survey data consequence analysis was listed below in Figure 38:

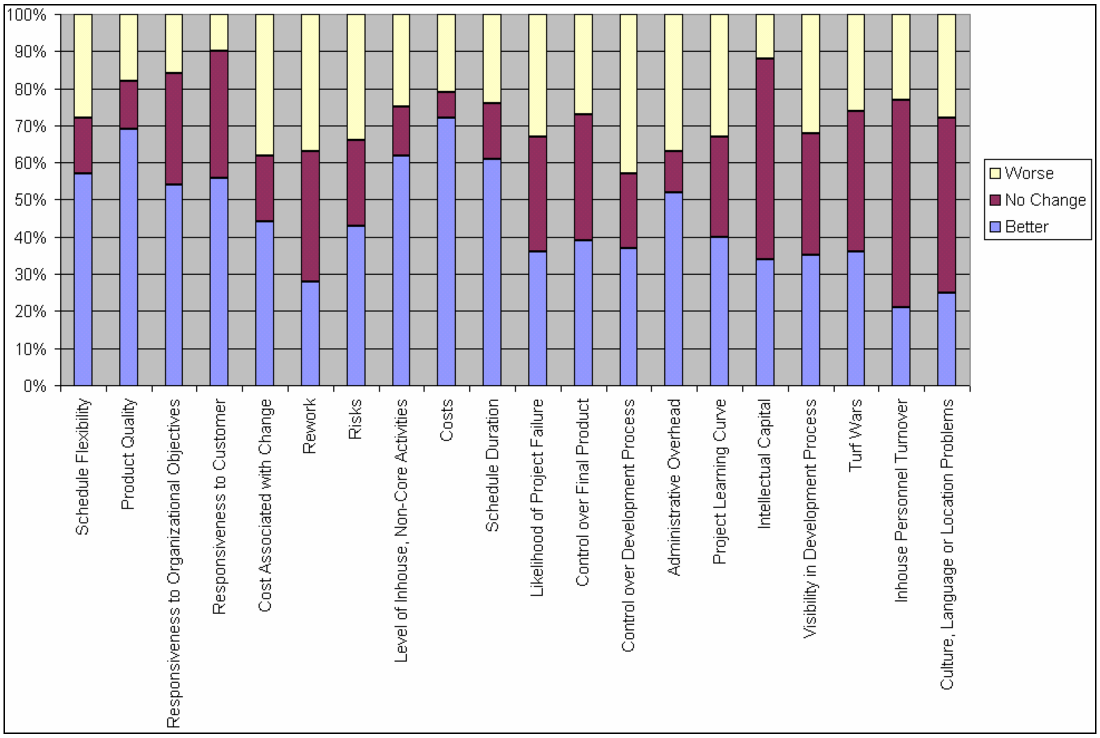


Figure 38 New Survey Data Consequence Analysis

The results were very different. Every consequence had better present results. While these two figures provided an excellent overview of the changes, Figure 39 pointed out the actual differences:

Consequence	Response Mean	Stand. Dev	Stand. Error	Worse %	Neutral %	Better %	Old worse %	Old better %	Diff. better	Diff. worse
Schedule Flexibility	4.50	1.60	0.24	0.28	0.15	0.57	0.26	0.55	0.02	0.02
Product Quality	4.86	1.23	0.19	0.18	0.13	0.69	0.27	0.47	0.22	-0.09
Responsiveness to Organizational Objectives	4.52	1.30	0.20	0.16	0.30	0.54	0.31	0.42	0.12	-0.15
Responsiveness to Customer	4.73	1.21	0.18	0.10	0.34	0.56	0.29	0.36	0.20	-0.19
Cost Associated with Change	3.73	1.59	0.24	0.38	0.18	0.44	0.35	0.33	0.11	0.03
Rework	4.16	1.41	0.22	0.37	0.35	0.28	0.34	0.31	-0.03	0.03
Risks	3.75	1.54	0.23	0.34	0.23	0.43	0.39	0.31	0.12	-0.05
Level of Inhouse, Non-Core Activities	3.36	1.67	0.25	0.25	0.13	0.62	0.22	0.29	0.33	0.03
Costs	2.98	1.65	0.24	0.21	0.07	0.72	0.46	0.29	0.43	-0.25
Schedule Duration	3.41	1.33	0.20	0.24	0.15	0.61	0.50	0.28	0.33	-0.26
Likelihood of Project Failure	3.86	1.46	0.22	0.33	0.31	0.36	0.31	0.26	0.10	0.02
Control over Final Product	4.27	1.28	0.19	0.27	0.34	0.39	0.38	0.22	0.17	-0.11
Control over Development Process	4.00	1.56	0.23	0.43	0.20	0.37	0.48	0.23	0.14	-0.05
Administrative Overhead	3.61	1.77	0.26	0.37	0.11	0.52	0.44	0.22	0.30	-0.07
Project Learning Curve	3.93	1.51	0.23	0.33	0.27	0.40	0.31	0.20	0.20	0.02
Intellectual Capital	4.41	1.22	0.18	0.12	0.54	0.34	0.13	0.19	0.15	-0.01
Visibility in Development Process	4.14	1.34	0.21	0.32	0.33	0.35	0.51	0.17	0.18	-0.19
Turf Wars	3.93	1.44	0.22	0.26	0.38	0.36	0.39	0.08	0.28	-0.13
Inhouse Personnel Turnover	4.02	1.26	0.19	0.23	0.56	0.21	0.09	0.06	0.15	0.14
Culture, Language or Location Problems	3.98	1.14	0.17	0.28	0.47	0.25	0.37	0.03	0.22	-0.09

Figure 39 New Survey Data Consequence Differences Analysis

The differences (new minus old) were shown in the last two columns. Every consequence, except schedule flexibility and rework, had a 10 to 40 percent increase in success. The negative responses remained either constant or showed a slight decline. Cost, product quality, schedule duration, responsiveness to both customer and organizations, and level of non core activities showed to have the most positive shifts, now proving outsourcing could produce positive consequences in each of these areas. Five of the six consequences followed the previously discussed results from the goal importance and realization. Having this consistency within the survey was another harbinger of good survey data quality, thus should strengthen the support for SODS2.

4.3.6 Survey Data Analysis Summary

The outsourcing experience, assertions, goal importance and realization, and consequences old and new survey results were analyzed and compared with each other.

Significant differences were discovered throughout the analysis. The old and new survey results appeared to not be from the same population as thought to be true during methodology conception. Further explanation of such differences required regression modeling.

4.4 Regression Model Implementation

This implementation phase had three goals resulting from the previous analyses:

1. Validate regression modeling techniques are similar to those same techniques used in building the models for SODS1,
2. Research differences between the new and used data populations, and
3. Build regression models for outsourcing consequences similar to those used in SODS1 with the exception of using all three, old, new and used, data sets with 75% stepwise entry/removal statistics.

4.4.1 Regression Modeling Technique Validation

Before any comparisons could be made to the old survey data goal realization regression models, methodology was undertaken to validate the old model making techniques were the same as the new model making techniques used in this research. The same stepwise entry statistic of 95% and removal statistic of 90% were used. Goal realization of response to organization was randomly picked for this validation effort. Appendix A showed an exact match between this model and the model documented in the Hermann's dissertation. To reconfirm this result, response to customer goal realization was picked, and as shown in Appendix A, another exact match was produced. This confirmed that this author's modeling techniques were consistent with the techniques used in the dissertation.

4.4.2 Regression Model Differences in 14 Goal Realizations

Once the modeling techniques were validated, 14 goal realizations models were created using the new survey data and the same entry/removal statistics, 95%/90%, that were used by Hermann in creating his 14 goal realization models. The purpose for the creation of these models was two fold:

1) Help explain the differences between the new and used survey data and
2) Provide an overview of the modeling techniques that was going to be used in the creation of the consequence models.

Table 34 showed the differences between the models:

Table 34 Differences in Old and New Goal Realization Models

New Goal Realization Model	Old Goal Realization Model
AddPeopleCapacity = 3.10 - (1.97)sys-embed - (1.16)ent-acctng + (.75)proc-maint	[No Model Found Matching Entry/Removal Stats]
AddPeopleShortTerm = 2.97 - (.97)sys-device + (2.02)comp-os	AddPeopleShortTerm = 3.03 - (.62)prod-commoncust + (.87)ent-acctng
CashFlow = 2.74 - (.88)comp-development + (.74)proc-toolsup	CashFlow = 2.88 - (1.02)sys-device - (.43)ent-web
Control = 2.57 + (2.43)comp-case + (1.43)comp-os	Control = 2.55 + (.99)proc-reeng - (.69)proc-req
Expertise = 3.71 - (.71)prod-custom	Expertise = 2.86 + (.59)sys-all - (1.20)shrink-internet + (.64)proc-reeng
NonCore = 2.88 - (1.09)shrink-util + (1.14)comp-domain + (1.48)ent-mnft	NonCore = 3.25 - (.85)sys-device - (.48)prod-cots
Quality = 3.28 + (.86)proc-sweng - (.63)prod-cust	Quality = 2.73 - (1.33)sys-device
ReduceCost = 2.88 + (.82)proc-reeng	ReduceCost = 2.66 - (.58)proc-fielding
ScheduleParallel = 2.76 + (1.11)proc-spec	ScheduleParallel = 2.70 - (.66)proc-sweng + (1.05)sys-avionics
ScheluleVendor = 2.68 - (1.50)proc-design + (.97)proc-test + (1.21)proc-spec	ScheluleVendor = 2.25 + (.57)proc-req
ResponseCustomer = 2.73 + (1.34)comp-os - (1.05)comp-development - (1.20)proc-design + (1.36)proc-test + (.64)proc-applsup + (1.18)prod-none	ResponseCustomer = 2.92 - (.85)proc-sweng - (1.01)sys-device + (1.51)ent-oes + (.97)sys-avionics

ResponseOrganization = 2.97 + (1.36)shrink-util + (1.53)comp-os	ResponseOrganization = 2.31 - (1.18)sys-device - (.61)proc-sweng + (.79)proc-coding
RiskSharing = 2.90 - (.73)comp-development + (1.60)ent-payroll + (1.10)proc-none	RiskSharing = 2.86 - (.53)proc-sweng
StaffStable = 3.03 = (1.98)comp-os	StaffStable = 2.78 + (.69)proc-maint - (.76)proc-cm + (.45)proc-reeng + (1.22)prod-none

The differences were significant. There were no common input variables between the old and new models. Only four of the 14 had a similar intercept ± 10% which could have been forecasted given the goal satisfaction analysis in the above paragraphs. After this point, the research methodology was modified slightly due to these differences uncovered in these models and during the analysis. Adding the new and used data together might overshadow important developments in software outsourcing. Yet, if the data was not added, the similarities running parallel through both data sets would never be manifested. The solution to this dilemma was unavoidable, all three (new, old and combined) data models were created and used in SODS2 to provide the support required to help decision makers.

Another concern brought forth from these changes was the number of variables included in each model under the stepwise entry statistic of 95%. This tight restriction failed to find any input variables for the adding people for capacity consequence model. Evaluating the 34 goal satisfaction and consequence models presented in Hermann's dissertation, the author found that no input variables had been removed. This was due to the tightly constrained removal statistic at 90%. Given this and the fact that SODS2 relied on the accuracy of the NN learning mechanism, the entry/removal statistics

expanded to 75% so that more input variables between the three data sets could be researched. This change resulted in an additional step in the research. The old data models were going to have to be recreated along with the new and combined models using the new 75% entry/removal statistics.

4.4.3 SODS2 Consequence Regression Models

While the model changes caused an increase in effort for this phase, this additional work was crucial to assuring that all of the models' input variables were being caught between the new, old and combined models. In Appendices B, C and D, the new, old and combined consequence regression models were listed in their fullest detail. This section explained the differences between the old and new outsourcing consequence models as summarized in Figure 40. The model differences showed that the project data samples appeared to be from different populations. This meant, according to the survey data, that the software outsourcing world had significantly changed from the original data collection of projects from 1995-2000 to the newer data collection of projects from 2000-2003. The differences may have been attributed to dramatic changes in the technology, economy and a longer history of software outsourcing experiences. In some cases, the intercept values of each model were significantly different which would clearly demonstrate this concept. While each independent (predictor) variable was compared across the models, the reader is cautioned to remember that a significant change in the intercept could intensify or eliminate differences between each predictor variable. Similar caution should be paid to interpolation effects. Interpolation was the effect of the model trying to make predicted outcomes based on little or no matching patterns in the

survey. The new data samples found little data relating to system (avionics, embedded and development tool) software domains, shrinkwrap (entertainment and utility) software domains, component (CASE and library class) software domains, enterprise (manufacturing, order entry, scripting and website) software domains, and outsourced (documentation and none) processes. Similarly, the old data samples found little data relating to shrinkwrap (entertainment and utility) software domains, component (CASE and library class) software domains, enterprise (manufacturing, payroll and order entry) software domains, outsourced (none) process and outsourced (none) products. These independent variables will thus be skewed more toward the intercept as the result of having no observations or toward a biased mean as the results of having few samples to be used in the computations. This was also another reason why the combined models were created even though there were many differences between the two data populations. All models along with their performance measures were included in Figure 40 listed on the next four pages.

Figure 40 Summary of Old, New and Combined Models

Old Data Model	Info	New Data Model	Info	Combined Data Model	Info
Cost = 3.57 + (-.50)sys-embed + (-.46)sys-comm + (-2.62)comp-case + (1.36)comp-os + (.92)ent-acct + (4.29)ent-mnft + (-1.53)ent-oes + (.73)proc-spec + (-.85)proc-cm + (1.12)prod-cust + (.60)prod-cots	RSqr = .44 RMSE = 1.17 # Samples = 81	Cost = 3.70 + (.94)sys-comm + (-3.33)comp-case + (1.36)ent-mnft + (-1.72)ent-pay + (-1.38)prod-cust + (.89)prod-comcust	RSqr = .35 RMSE = 1.43 # Samples = 46	Cost = 4.04 + (-.54)shrink-bus + (-.88)shrink-int + (-2.75)comp-case + (1.52)ent-mnft + (-1.87)ent-pay + (1.33)ent-web + (.53)proc-design + (-.76)proc-test + (-.51)proc-maint + (.77)proc-spec + (-.77)proc-cm + (.57)proc-swengsup + (.42)prod-cots + (.41)prod-comcust	RSqr = .29 RMSE = 1.49 # Samples = 127
Sched = 3.42 + (1.57)sys-avia + (-.70)sys-comm + (-.68)shrink-bus + (-.85)ent-acct + (2.72)ent-mnft + (1.03)proc-des + (.87)proc-reeng + (-.86)proc-doc + (1.41)proc-field + (-1.72)proc-cm + (.53)prod-cust	RSqr = .34 RMSE = 1.38 # Samples = 81	Sched = 3.14 + (.81)sys-embed + (-2.50)sys-dev + (1.10)shrink-bus + (1.10)shrink-util + (-1.15)ent-acct + (-1.80)ent-script + (-.93)proc-maint + (.90)proc-reeng + (1.26)proc-train	RSqr = .51 RMSE = 1.04 # Samples = 46	Sched = 3.05 + (1.17)sys-avia + (.68)sys-embed + (-.87)sys-dev + (.61)shrink-bus + (-.82)ent-pay + (1.05)ent-web + (-.82)proc-req + (1.13)proc-design + (.82)proc-reeng + (-.55)proc-doc + (1.14)proc-field + (-1.45)proc-cm + (.58)proc-swengsup + (.51)prod-comcust	RSqr = .31 RMSE = 1.38 # Samples = 127
IntelCap = 4.71 + (1.09)shrink-bus + (-.99)shrink-util + (1.37)comp-domain + (-1.67)comp-case + (-.65)comp-dev + (1.40)ent-mnft + (.67)ent-script + (.51)proc-reeng + (.59)proc-appsup + (.95)proc-train + (-.44)proc-coding + (-1.68)proc-field + (-.59)proc-swengsup + (-.29)prod-cust	RSqr = .62 RMSE = .69 # Samples = 79	IntelCap = 3.38 + (.78)sys-dev + (1.36)shrink-int + (1.00)comp-domain + (-1.44)comp-os + (.84)ent-acct + (.82)proc-maint + (-.77)proc-field + (-1.47)proc-cm + (1.50)proc-toolsup + (1.37)proc-swengsup	RSqr = .58 RMSE = .89 # Samples = 46	IntelCap = 4.05 + (.63)shrink-int + (1.08)comp-domain + (-.51)comp-dev + (-.56)ent-web + (-.36)proc-test + (.59)proc-reeng + (.67)proc-appsup + (.81)proc-train + (-.46)proc-spec + (.37)proc-coding + (-1.00)proc-field + (-1.04)proc-none + (-.55)prod-cots + (.35)prod-comcust	RSqr = .38 RMSE = .93 # Samples = 125
SchedFlex = 4.19 + sys-avia(-1.35) + sys-comm(1.06) + comp-CASE(-1.53) + comp-OS(-0.90) + ent-acct(1.52) + proc-req(-1.14) + proc-reeng(0.76) + proc-spec(0.87) + proc-field(-0.83)	RSqr = .34 RMSE = 1.25 # Samples = 80	SchedFlex = 4.68 + sys-embed(-2.53) + shrink-bus(-1.10) + comp-CASE(-5.00) + comp-class(-2.94) + comp-dev(-1.32) + ent-acct(1.92) + ent-pay(-1.19) + proc-des(-1.25) + proc-test(2.19) + proc-coding(0.55) + proc-CM(-3.01) + proc-SWEngSup(1.84) + prod-comcust(1.77)	RSqr = .74 RMSE = .97 # Samples = 46	SchedFlex = 4.57 + sys-avia(-1.00) + sys-embed(-0.93) + sys-comm (0.66) + shrink-bus(-0.42) + shrink-int(0.55) + comp-domain(-0.82) + comp-CASE(-1.14) + comp-OS(-0.67) + ent-acct(0.66) + proc-field(-0.87)	RSqr = .21 RMSE = 1.39 # Samples = 126
AdminOverhead = 4.39 + sys-avia(2.31) + shrink-util(2.62) + shrink-int(1.26) + comp-domain(-1.47) + ent-mnft(2.87) + ent-OES(-1.26) + proc-appsup(.99) + proc-doc(-1.07) + proc-field(0.52) + proc-CM(-1.16) + prod-comcust(0.47)	RSqr = .43 RMSE = 1.05 # Samples = 80	AdminOverhead = 4.27 + shrink-int(0.78) + comp-class(-2.21) + comp-OS(-1.84) + proc-req(1.33) + proc-test(-1.22) + proc-toolsup(1.52) + proc-SWEngSup(-1.70) + prod-comcust(0.78) + prod-none(-2.55)	RSqr = .53 RMSE = 1.36 # Samples = 46	AdminOverhead = 4.20 + sys-avia(1.16) + shrink-util(0.90) + comp-CASE(-1.28) + comp-class(-1.74) + comp-OS(-0.95) + ent-web(0.83) + proc-CM(-1.10) + proc-toolsup(0.97) + prod-comcust(0.62) + prod-none(-1.99)	RSqr = .31 RMSE = 1.33 # Samples = 126

(Figure 40 cont.) Summary of Old, New and Combined Models

Old Data Model	Info	New Data Model	Info	Combined Data Model	Info
Rework = 4.07 + sys-comm(-0.44) + sys-dev(1.36) + shrink-int(1.13) + ent-script(-0.80) + proc-reeng(-1.04) + proc-SWEngSup(0.39) + prod-COTS(1.19)	RSqr = .24 RMSE = 1.20 # Samples = 78	Rework = 3.83 + sys-avia(1.67) + shrink-util(1.86) + comp-dev(0.80) + proc-appsup(0.78) + proc-SWEngSup(-0.83) + proc-none(1.67)	RSqr = .32 RMSE = 1.26 # Samples = 44	Rework = 4.22 + sys-comm(-0.61) + shrink-util(1.22) + comp-OS(-0.74) + comp-dev(0.84) + ent-OES(-1.17) + proc-des(0.52) + proc-reeng(-0.42) + proc-coding(-0.52) + proc-none(1.28) + prod-COTS(0.78)	RSqr = .21 RMSE = 1.25 # Samples = 122
Visibility = 2.78 + sys-comm(0.69) + comp-dev(-0.71) + ent-OES(1.98) + ent-script(1.25) + ent-web(-0.48) + proc-des(-0.56) + proc-maint(0.68) + proc-reeng(1.51) + proc-field(-0.88) + proc-SWEngSup(-0.38) + prod-cust(0.82) + prod-none(2.50)	RSqr = .42 RMSE = 1.09 # Samples = 80	Visibility = 4.13 + sys-avia(-0.75) + sys-embed(0.90) + sys-comm(1.59) + sys-dev(2.95) + shrink-util(-2.31) + comp-CASE(-1.13) + comp-OS(-2.38) + comp-dev(1.73) + ent-script(-1.30) + proc-test(1.10) + proc-reeng(-1.37) + proc-spec(0.84) + proc-coding(-2.27) + proc-CM(-1.34) + proc-SWEngSup(2.02) + proc-none(-3.64) + prod-cust(0.41) + prod-comcust(-0.60) + prod-none(3.02)	RSqr = .87 RMSE = .66 # Samples = 43	Visibility = 2.86 + sys-comm(0.51) + shrink-bus(0.55) + ent-OES(2.06) + proc-reeng(0.38) + proc-appsup(0.70) + proc-coding(-0.37) + proc-field(-1.32) + proc-none(-2.20) + prod-cust(0.78) + prod-comcust(0.37) + prod-none(2.56)	RSqr = .32 RMSE = 1.19 Samples = 123
ControlProduct = 4.19 + sys-dev(-1.08) + shrink-util(1.77) + comp-domain(-0.86) + proc-reeng(0.61) + proc-appsup(1.81) + proc-field(-0.66) + proc-toolsup(-0.76) + proc-SWEngSup(-0.46) + prod-COTS(-0.97) + prod-comcust(-0.66)	RSqr = .39 RMSE = 1.09 # Samples = 80	ControlProduct = 3.70 + proc-req(1.29) + proc-test(-0.51) + proc-train(0.50) + proc-field(-2.41) + proc-SWEngSup(0.95) + prod-none(1.70)	RSqr = .48 RMSE = .99 # Samples = 45	ControlProduct = 3.95 + sys-embed(-0.54) + shrink-util(1.68) + comp-domain(-0.78) + proc-reeng(0.84) + proc-appsup(0.83) + proc-doc(0.45) + proc-field(-1.17) + proc_toolsup(-0.48) + prod-COTS(-0.80) + prod-none(0.88)	RSqr = .30 RMSE = 1.15 # Samples = 125
ChangeCost = 4.07 + sys-avia(0.86) + shrink-int(1.39) + comp-OS(1.60) + ent-acct(1.34) + ent-mnft(1.48) + ent-OES(-1.97) + ent-web(-0.88) + proc-SWEngSup(0.45) + prod-COTS(0.71)	RSqr = .35 RMSE = 1.08 # Samples = 79	ChangeCost = 4.22 + shrink-util(1.25) + comp-class(-2.27) + proc-coding(-0.71) + proc-none(1.86) + prod-comcust(1.29) + prod-none(-2.08)	RSqr = .36 RMSE = 1.35 # Samples = 45	ChangeCost = 4.12 + sys-avia(1.19) + shrink-bus(-0.47) + shrink-int(-0.50) + comp-class(-1.27) + comp-OS(0.78) + ent-mnft(1.39) + proc-des(0.46) + proc-test(-0.65) + proc-spec(0.66) + proc-CM(-0.55) + proc-none(1.48) + prod-COTS(0.40) + prod-comcust(0.76) + prod-none(-1.36)	RSqr = .28 RMSE = 1.29 # Samples = 124
LangCult = 4.07 + sys-avia(0.52) + shrink-util(1.50) + comp-OS(-0.35) + ent-acct(0.81) + ent-OES(-0.61) + proc-req(-0.45) + proc-des(0.72) + proc-field(-0.59) + proc-SWEngSup(0.50) + prod-cust(-0.37) + prod-comcust(0.48)	RSqr = .46 RMSE = .62 # Samples = 78	LangCult = 5.09 + sys-embed(2.46) + shrink-util(-1.68) + comp-domain(1.30) + comp-class(-0.92) + comp-OS(-2.14) + ent-pay(1.75) + proc-des(-1.58) + proc-reeng(-0.82) + proc-appsup(-1.07) + proc-spec(1.32) + proc-field(1.00) + proc-CM(0.87) + prod-cust(-0.64) + prod-none(-1.37)	RSqr = .61 RMSE = .87 # Samples = 44	LangCult = 4.11 + sys-avia(0.70) + sys-embed(0.59) + comp-class(-1.28) + comp-OS(-0.76) + comp-dev(-0.28) + ent-acct(0.41) + ent-pay(1.14) + proc-appsup(-0.51) + proc+SWEngSup(0.29) + prod-COTS(0.32) + prod-comcust(0.44)	RSqr = .22 RMSE = .88 # Samples = 122

(Figure 40 cont.) Summary of Old, New and Combined Models

Old Data Model	Info	New Data Model	Info	Combined Data Model	Info
ControlProcess = 4.71 + shrink-util(1.89) + comp-domain(-1.25) + comp-dev(-0.69) + proc-des(-1.38) + proc-reeng(1.50) + proc-spec(0.52) + proc-toolsup(-0.67) + prod-COTS(-0.81) + prod-comcust(-0.46)	RSqr = .37 RMSE = 1.28 # Samples = 80	ControlProcess = 3.96 + sys-avia(2.11) + sys-dev(1.79) + shrink-util(-1.48) + comp-OS(-1.48) + comp-dev(1.67) + ent-mnft(-1.00) + ent-pay(-1.05) + proc-appsup(1.13) + proc-coding(-1.14) + proc-SWEngSup(1.10) + prod-COTS(0.86) + prod-none(-1.17)	RSqr = .63 RMSE = 1.10 # Samples = 46	ControlProcess = 4.19 + comp-domain(-0.74) + ent-acct(0.77) + ent-mnft(-1.20) + ent-pay(-1.71) + proc-des(-1.35) + proc-reeng(0.80) + proc-appsup(0.86) + proc-field(-1.22) + proc-CM(0.43) + proc-none(-1.69) + prod-cust(0.42)	RSqr = .35 RMSE = 1.30 # Samples = 126
InhouseNonCore = 3.64 + sys-avia(-1.21) + comp-dev(0.48) + ent-acct(0.86) + ent-mnft(2.34) + ent-OES(-1.81) + ent-web(0.62) + proc-toolsup(-0.83) + proc-SWEngSup(0.85) + prod-COTS(0.67) + prod-none(-1.14)	RSqr = .40 RMSE = 1.07 # Samples = 78	InhouseNonCore = 2.65 + sys-comm(-0.92) + comp-OS(1.48) + comp-dev(1.86) + ent-script(-1.91) + proc-req(-1.00) + proc-des(2.06) + proc-test(-0.89) + proc-reeng(1.37)	RSqr = .44 RMSE = 1.38 # Samples = 45	InhouseNonCore = 3.61 + sys-avia(-1.53) + shrink-int(-1.01) + comp-class(-1.93) + comp-dev(0.93) + ent-acct(0.81) + ent-pay(1.16) + ent-OES(-1.75) + ent-script(-1.30) + ent-web(0.86) + proc-des(0.32) + prod-none(-1.15)	RSqr = .32 RMSE = 1.26 # Samples = 123
InhouseTurnover = 4.31 + sys-avia(-0.45) + sys-dev(-0.44) + shrink-bus(-0.54) + comp-CASE(-0.89) + ent-acct(0.60) + ent-OES(-0.65) + ent-script(-0.43) + proc-des(-0.22) + proc-maint(-0.35) + proc-CM(0.33) + proc-SWEngSup(0.32)	RSqr = .42 RMSE = .55 # Samples = 79	InhouseTurnover = 2.53 + comp-OS(1.74) + comp-dev(2.21) + ent-script(-1.65) + proc-req(-1.06) + proc-des(2.47) + proc-test(-0.88) + proc-reeng(1.11) + proc-spec(-0.72)	RSqr = .51 RMSE = 1.31 # Samples = 43	InhouseTurnover = 4.11 + sys-embed(0.42) + sys-dev(-0.52) + comp-CASE(-0.60) + comp-OS(-0.73) + proc-test(-0.36) + proc-SWEngSup(0.59) + proc-none(-2.11) + prod-comcust(0.25)	RSqr = .27 RMSE = .81 # Samples = 122
LearningCurve = 4.27 + comp-CASE(-1.56) + comp-class(-1.48) + ent-OES(-1.12) + ent-script(0.87) + proc-maint(-0.36) + prod-comcus(0.55)	RSqr = .42 RMSE = 1.06 # Samples = 79	LearningCurve = 3.15 + shrink-util(1.54) + comp-CASE(-3.72) + comp-class(-1.90) + ent-pay(-1.14) + proc-appsup(0.64) + proc-train(-0.70) + proc-coding(1.29) + proc-CM(-0.62) + proc-none(-1.15) + prod-comcust(1.91)	RSqr = .59 RMSE = 1.10 # Samples = 45	LearningCurve = 3.83 + shrink-util(0.70) + comp-CASE(-1.79) + comp-class(-0.94) + ent-pay(-1.29) + ent-script(0.66) + proc-train(-0.40) + proc-none(-1.83) + prod-cust(0.45) + prod-comcust(0.80)	RSqr = .29 RMSE = 1.13 # Samples = 124
Risk = 4.52 + sys-comm(-1.01) + ent-OES(-1.64) + ent-script(-1.27) + ent-web(-0.53) + proc-CM(-1.39) + proc-SWEngSup(0.63) + prod-COTS(1.02)	RSqr = .31 RMSE = 1.36 # Samples = 80	Risk = 3.48 + sys-embed(1.01) + shrink-util(1.51) + comp-OS(-1.49) + ent-pay(-0.99) + prod-comcust(1.52)	RSqr = .38 RMSE = 1.28 # Samples = 45	Risk = 4.42 + sys-avia(-0.89) + sys-comm(-0.80) + shrinkutil(1.67) + comp-OS(-1.20) + comp-dev(0.60) + ent-OES(-2.48) + ent-script(-1.74) + ent-web(-1.00) + proc-reeng(0.43) + proc-train(-0.64) + proc-doc(0.87) + proc-CM(-0.54) + proc-SWEngSup(0.40) + prod-none(-1.78)	RSqr = .30 RMSE = 1.38 # Samples = 125
Quality = 4.55 + proc-reeng(1.15) + proc-SWEngSup(-0.63) + prod-COTS(-1.21)	RSqr = .19 RMSE = 1.36 # Samples = 79	Quality = 4.43 + sys-embed(-1.27) + sys-dev(1.83) + shrink-util(0.89) + shrink-int(0.87) + comp-CASE(1.44) + comp-class(-0.88) + proc-spec(0.89) + proc-coding(-1.33) + prod-cust(1.10) + prod-none(1.07)	RSqr = .48 RMSE = 1.01 # Samples = 45	Quality = 4.58 + sys-embed(-0.53) + shrink-util(0.75) + shrink-int(0.67) + comp-OS(1.20) + ent-OES(1.13) + proc-reeng(0.62) + proc-field(-0.60) + prod-COTS(-0.89) + prod-comcust(-0.45) + prod-none(0.82)	RSqr = .23 RMSE = 1.29 # Samples = 124

(Figure 40 cont.) Summary of Old, New and Combined Models

Old Data Model	Info	New Data Model	Info	Combined Data Model	Info
TurfWar = 4.28 + sys-avia(-0.63) + sys-dev(1.29) + shrink-int(1.32) + comp-class(-0.82) + comp-OS(-0.76) + ent-acct(0.87) + ent-mnft(1.54) + proc-reeng(-0.89) + proc-appsup(-1.99) + proc-spec(-0.53) + proc-toolsup(1.21) + proc-SWEngSup(0.95) + prod-COTS(0.94)	RSqr = .57 RMSE = .86 # Samples = 77	TurfWar = 5.11 + sys-embed(1.43) + sys-dev(-1.36) + shrink-int(-0.73) + ent-script(-1.82) + proc-des(-1.31) + proc-CM(1.48) + proc-SWEngSup(-1.75) + prod-comcust(0.85) + prod-none(-1.44)	RSqr = .48 RMSE = 1.17 # Samples = 45	TurfWar = 4.62 + sys-embed(0.47) + comp-CASE(-1.04) + comp-OS(-1.07) + comp-dev(0.48) + ent-acct(0.80) + ent-mnft(1.42) + ent-web(0.63) + proc-req(0.54) + proc-reeng(-0.97) + proc-appsup(-1.15) + proc-train(-0.68) + proc-coding(-0.60) + proc-CM(-0.51) + proc-toolsup(1.55) + proc-none(-1.12) + prod-COTS(1.16)	RSqr = .36 RMSE = 1.14 # Samples = 122
FailLikely = 3.85 + sys-dev(1.04) + shrink-int(1.58) + proc-req(-0.70) + proc-reeng(-0.90) + proc-CM(-1.09) + proc-toolsup(1.42) + proc-SWEngSup(0.95) + prod-COTS(0.82)	RSqr = .36 RMSE = 1.17 # Samples = 79	FailLikely = 3.56 + shrink-bus(-0.46) + shrink-util(2.31) + comp-class(-2.76) + ent-acct(-1.29) + ent-script(-2.18) + proc-req(0.65) + proc-test(0.59) + proc-maint(0.43) + proc-reeng(1.08) + proc-field(2.14) + proc-toolsup(-1.20) + proc-SWEngSup(-1.59) + prod-COTS(-0.75) + prod-comcust(2.15)	RSqr = .75 RMSE = .87 # Samples = 45	FailLikely = 3.22 + shrink-int(0.52) + comp-domain(0.55) + comp-CASE(-0.92) + comp-class(-2.46) + comp-OS(-0.59) + comp-dev(0.40) + ent-mnft(1.34) + ent-pay(1.14) + proc-des(0.53) + proc-train(-0.50) + proc-CM(-1.27) + proc-toolsup(1.47) + prod-cust(0.43) + prod-comcust(0.83)	RSqr = .32 RMSE = 1.24 # Samples = 124
ResponseCustomer = 4.72 + comp-domain(-0.87) + ent-OES(1.84) + proc-maint(0.40) + proc-appsup(-1.22) + prod-cust(-0.52) + prod-comcust(-0.79)	RSqr = .22 RMSE = 1.24 # Samples = 80	ResponseCustomer = 4.17 + shrink-bus(-0.78) + shrink-int(0.52) + comp-domain(1.37) + comp-class(-2.05) + ent-acct(2.08) + ent-script(-0.74) + proc-req(0.86) + proc-des(-0.60) + proc-maint(-0.51) + proc-reeng(-0.47) + procappsup(-0.97) + proc-train(0.90) + proc-SWEngSup(0.96) + proc-none(-2.38) + prod-cust(0.87) + prod-comcust(0.67) + prod-none(2.10)	RSqr = .80 RMSE = .68 # Samples = 45	ResponseCustomer = 4.91 + sys-embed(-0.51) + shrink-util(1.38) + comp-domain(-0.62) + comp-CASE(1.55) + ent-OES(1.04) + ent-web(-0.45) + proc-req(0.71) + proc-train(0.68) + proc-spec(-0.74) + proc-field(-0.83) + proc-CM(0.93) + proc-SWEngSup(-0.79) + proc-none(-1.41) + prod-cust(-0.47) + prod-COTS(-0.67) + prod-comcust(-0.39)	RSqr = .27 RMSE = 1.21 # Samples = 125
ResponseOrg = 3.67 + ent-OES(1.82) + proc-maint(0.74) + proc-appsup(-1.27) + proc-coding(0.66) + proc-SWEngSup(-0.77)	RSqr = .21 RMSE = 1.42 # Samples = 81	ResponseOrg = 3.92 + sys-comm(0.89) + shrink-util(-1.68) + comp-class(-1.22) + ent-acct(1.02) + proc-req(-1.15) + proc-train(0.62) + proc-field(-1.53) + proc-SWEngSup(2.51) + prod-none(0.88)	RSqr = .56 RMSE = .97 # Samples = 44	ResponseOrg = 4.21 + sys-comm(0.54) + sys-dev(-0.96) + comp-CASE(1.68) + comp-OS(0.74) + ent-mnft(-1.30) + ent-OES(1.41) + proc-req(-0.51) + proc-coding(0.41) + proc-field(-0.93) + proc-CM(0.91) + prod-cust(-0.51)	RSqr = .20 RMSE = 1.38 # Samples = 125

4.4.3.1 Cost Consequence

The cost consequence dictated the money saved for projects using outsourcing rather than in-house development. Even though many organizations sought using outsourcing to reduce the overall cost of the software development effort, figures showed this goal was not outsourcing's strongest suit. Both models started out with similar intercepts that held this consequence at neutral which was even with those organizations that chose not to outsource. Embedded systems, operating system components, and enterprise (accounting and order entry) software domains along with outsourcing (specifications and configuration management) processes and COTS products were included in the original model but not in the new model. The new model found enterprise payroll software domain and outsourcing customizable common software products as indicating variables which were not included in the old model. System communication, CASE component and enterprise manufacturing software domains found a common theme in both models. System communication software domain saw an old model decreasing effect change into an increasing effect for the new model. CASE component software domain correlated with a significant decrease in cost and with similar magnitudes between the two models. Enterprise manufacturing software domain associated with higher cost though the magnitude of this increase was dramatically less in the new model. Outsourcing customizable/ specialized software products showed an increase in cost from the old model to a decrease in cost from the new model. Both models were considered somewhat similar with only 17 marks separating the two. The older model did have higher accuracy with a 0.44 R^2 value and less noise with a 1.17

Regression MSE (RMSE) value making it the choice model to use despite being built with older data.

4.4.3.2 Schedule Duration Consequence

The schedule duration consequence defined the outsourcing goals and efforts used in order to complete the software development project faster. Unlike the above cost consequence, both intercepts from both models signified that outsourcing was meeting this goal somewhat by slightly decreasing the project schedule duration when compared to those not outsourcing. The indicating variables included in the old model and not in the new model included: (avionic and communication) system software domains, enterprise manufacturing software domain, outsourcing (design, documentation, fielding and configuration management) processes, and outsourcing custom/special products. This moved these variables in line with the intercept of having a slightly decrease schedule. The (embedded and device) system software domains, shrink-wrap utility software domain, enterprise scripting software domain, and outsourcing (maintenance and training) processes found to be included in the new model but not in the original model. Shrink-wrap business software domain, enterprise accounting software domain, and outsourcing reengineering process were common to both models with the enterprise accounting software domain and outsourcing reengineering process sharing almost the exact multiplier. The shrink-wrap business software domain showed to have an increase effect to schedule whereas in the original model it was listed to having a negative effect. Given these changes, the two models were somewhat similar with only 21 marks

separating them. The newer model did have higher accuracy with a R^2 value of 0.51 and less noise with a RMSE value of 1.04 thus making it the choice model to use.

4.4.3.3 Intellect Capital Consequence

The intellectual capital consequence referred to an organization's (legal) ownership rights of a developed software product. Higher level rights were indicative of stronger ownership. A loss of intellectual capital was a concern for organizations, causing many to forgo outsourcing key software development for fear that external companies would hold their organization "hostage" since they alone possessed key information. The initial model showed an intercept with a slight increase in intellectual capital rights as compared to their counterparts who do not outsource software development. The new model showed a similar sized decrease in intellectual capital rights according to the intercept. The difference of 1.33 indicated that the new sample of outsourcing project was experiencing significantly reduce intellectual capital consequences. Shrink-wrap (business and utilities) projects, (CASE and development tools) component projects, enterprise (manufacturing and scripting) software projects, outsourced (reengineering, application support, training and coding/implementation) processes, and outsourced (custom/specialized) products were included in the initial model, but were no longer significantly correlated with intellectual capital consequences. Thus these project types and processes no longer experienced significant differences with their in-house counterparts. Several new independent variables including system development software, shrink-wrap internet products, operating system components, enterprise accounting software, outsourced (maintenance, configuration management and

tool support) processes were included in the new model and were absent in the original model. Operating system projects and configuration management outsourcing were now correlated with significant reduced intellectual capital while tool support outsourcing and Internet shrink-wrap products among the sample projects were indicative of significant higher intellectual capital. Domain framework components and outsourcing (fielding and software engineer support) processes were common to both models. While outsourcing the fielding process was still indicative of reduced intellectual capital, the magnitude of the reduction was significantly less than the original model. In both models, domain framework components indicated higher intellectual capital. In the original model, the outsourcing software engineer support was associated with a lower intellectual capital. The new model experienced a complete reverse effect showing software engineering support correlated with a significant higher amount of intellectual capital. Both models shared a higher than normal R^2 values along with lower than normal noise (RMSE) values. The new model was the model of choice due to being built with this latest observed data.

4.4.3.4 Schedule Flexibility Consequence

Schedule flexibility consequence gave the outsourcing organization the ability to change their schedule for possible reasons such as: increased number of projects being developed, decreased number of projects being developed, handle an increase in maintenance or reengineering tasks, or adding skilled personnel to any undermanned position that would otherwise cause a bottleneck in the project schedule. There was a slight difference between the original and new model. The original started out with a

neutral outcome meaning it was exactly the same as those who decided not to outsource. The new model, however, showed to have a slightly increase amount of schedule flexibility due to outsourcing. System (avionics and communications) software domains, operating system component software domain, and outsourcing (requirements, reengineering, specification and fielding) processes were found in the original model but not in the new model. Embedded system software domain, shrink-wrap business software domain, component (class library and development tool) software domains, enterprise payroll software domain, outsourcing (design, testing, coding, configuration management and software engineer support) processes and outsourcing customizable common products were all indicator variables included in the new model but not the old model. Enterprise accounting and CASE component software domains were common in both models. Enterprise accounting had almost the same multipliers, but CASE component software domain found to have twice the negative effect from the old model to the new model. The two models were somewhat separated with 31 marks between them. The newer model did have higher accuracy with a R^2 value of 0.74 and less noise with a RMSE value of 0.97, thus making it the choice model to use.

4.4.3.5 Admin Overhead Consequence

Administration overhead consequence concerned itself with goals to reduce the amount of management, legal support and paperwork needed by a software development project. It was assumed by many organizations that the overhead involved in outsourcing was a prime reason for not outsourcing. Figures have shown quite the opposite, and in some cases, actually decreased the amount of administrative overhead. Both models

started with an intercept placing this consequence as equal to those organizations not outsourcing. Those indicating variables found in the original model but not in the new model include: system avionics software domain, shrinkwrap utilities software domain, domain framework component software domain, enterprise (manufacturing and order entry) software domains, and outsourcing (application support, documentation, fielding and configuration management) processes. Those indicating variables found in the new model but not in the original include: component (class library and operating system) software domains, outsourcing (requirements, testing, tool support and software engineer support), and outsourcing no products. Shrinkwrap internet software domain and outsourcing customizable COTS products were common between both models with approximately the same increasing magnitude. The two models were somewhat different with 28 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.53, but the old model proved to have less noise with a RMSE value of 1.05. The new model was the model of choice due to the fact it was slightly more accurate and built with the latest data.

4.4.3.6 Control Process Consequence

Controlling the development process was a goal for organizations dissatisfied with their current control of their own in-house development shops. The initial intercept showed a small difference between the original and new model. The original model found that outsourcing could slightly improve this consequence whereas the new model showed only a neutral outcome. In either case, outsourcing did no worse at this control than those organizations not outsourcing. Domain frameworks component software

domain, outsourcing (design, reengineering, specification and tool support) processes, and outsourcing customizable COTS products were indicating variable in the original model but not in the new model. System (avionic and device) software domains, operating system component software domain, enterprise (manufacturing and payroll) software domains, outsourcing (application support, coding and software engineer support) processes, and total process outsourcing were indicating variables found in the new model but not in the original model. Shrinkwrap utility software domain, development tools component software domain, and outsourcing COTS products were common indicating variables between both models. Development tools component software domain and outsourcing COTS products found to alternate from decreasing this consequence in the old model to increasing this consequence in the new model. Shrinkwrap utility software domain saw the reverse of the above with it correlating with an increase of this consequence in the old model. While in the new model, this correlated with a decrease in process control. The two models were somewhat different with 25 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.63 and less noise with a RMSE value of 1.10 thus making it the choice model to use.

4.4.3.7 In-house Non Core Consequence

Effort spent on in-house non-core activities should be kept to a minimum. Some organizations sought to use outsourcing to minimize such non-core in-house activities. This saved time would allow organizations to put more in-house effort towards core or strategic type business. The intercept from the old model showed a neutral outcome which would be equal to those organizations not outsourcing. The new model found a

more favorable position. It had a slight decrease of the effort spent on non-core activities. These intercepts were suspected to change according to the selected indicating variable being used. For example, those organizations seeking to outsource their design process tended to find an increase in time spent on non-core tasks, but outsourcing requirements process would significantly decrease time used on non-core activities. System avionic software domain, enterprise (accounting, manufacturing, order entry and web-site) software domains, outsourcing (tool support and software engineer support) processes, outsourcing COTS product, and total process outsourcing showed to be indicators in the original models but not in the new models. System communication software domain, operating system component software domain, enterprise scripting software domain, and outsourcing (requirements, design, testing and reengineering) processes saw their way into the new model but not the old model. Development tools component software domain found to be the only common indicating variable between both models. It shared an increasing effect on this consequence. The two models were somewhat similar with 22 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.44, but the old model had less noise with a RMSE value of 1.07. The new model was the model of choice due to the fact it was a slightly more accurate and built with the latest data.

4.4.3.8 In-house Personnel Turnover Consequence

Many organizations feared that outsourcing would increase in-house personnel turnover. Those that have outsourced found in many cases this was not true. Outsourcing seemed to keep job conditions favorable so that in-house personnel did not

leave the organization. There was a slight intercept difference between the original and new model. The original started out with a neutral outcome meaning it was exactly the same as those who decided not to outsource. The new model however showed favorable signs to slightly and maybe even significantly decreased turnover. System (avionics and device) software domains, shrinkwrap business software domain, CASE component software domain, enterprise (accounting and order entry) software domains, and outsourcing (maintenance, configuration management and software engineer support) processes were found in the original model but not in the new model. Component (operating system and development tool) software domains and outsourcing (requirements, testing, reengineering and specification) processes were all indicator variables included in the new model but not the old model. Enterprise scripting software domain and outsourcing design process were common in both models. Enterprise scripting software domain had the same increasing effect but showed a higher magnitude of this effect in the new model. Outsourcing design process showed to have a slightly negative effect in the original model but a significant increasing effect in the new model. The two models were somewhat similar with 18 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.51. The older model had less noise with a RMSE value of 0.81. The new model was the model of choice due to the fact it was more accurate and built with the latest data.

4.4.3.9 Learning Curve Consequence

Learning curve consequence concerned itself with goals to reduce the learning curve. Time spent by employees climbing up the learning curve in order to develop the

software was expensive to both the schedule and to the total economical price tag associated with creating the software. For each hour spent learning what must be learned, the cost of the software project rose. For these reasons, some organization found it important to keep the learning curve as small as possible. Outsourcing was found to provide organizations a solution to reducing this learning curve. The old model started with its intercept placing this consequence as equal to those organizations not outsourcing. The new model's intercept showed favorable signs of slightly reducing this learning curve thus providing organizations a solution not realized by those who simply do not outsource. Those indicating variables found in the original model but not in the new model included: enterprise (scripting and order entry) software domains and outsourcing maintenance process. Those indicating variables found in the new model but not in the original included: shrinkwrap utility software domain, enterprise payroll software domain, outsourcing (application support, training, coding and configuration management) processes, and total product outsourcing. Component (CASE and class library) software domains and outsourcing customizable common products were common between both models. Component (CASE and class library) software domains significantly decreased the consequence in both models. Outsourcing customizable common products saw an increase in both models (a significant increase in the newer model). The two models were somewhat similar with 14 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.59, but the old model proved to have a little less noise with a RMSE value of 1.06. The new model was the model of

choice due to the fact it did a much better job explaining the outcome and built with the latest data.

4.4.3.10 Risk Consequence

Risk consequence referred to the ability for a project to use outsourcing in minimizing risks. Risk mitigation efforts among contract organizations provided the ability to pool creative solutions from multiple sources. The intercept from the old model showed a neutral to slightly increased outcome which would be at least equal to those organizations not outsourcing. The new model showed a complete different picture. It showed that risk minimization through outsourcing was slightly decreased which may be raised significantly depending upon how one chooses to outsource. System communication software domain, enterprise (order entry, scripting and web-site) software domains, outsourcing (configuration management and software engineer support) processes, and outsourcing COTS product proved to be indicators in the original models but not in the new models. System embedded software domain, shrinkwrap utility software domain, operating system component software domain, enterprise payroll software domain, and outsourcing customizable common products saw their way into the new model but not in the old model. Surprisingly, there were no common indicating variables. The two models were similar with 15 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.38 and proved to have less noise with a RMSE value of 1.28. The new model was the model of choice due to the fact it did a little better job explaining the outcome and was built with the latest data.

4.4.3.11 Quality Consequence

The quality consequence emphasized the quality of the end product. This end product could have been the software, a support process or documents. Both models started out with similar intercepts that hold this consequence between slightly increasing to a neutral outcome which was at least the same level of quality of those who do not outsource. Outsourcing (reengineering and software engineering support) processes and outsourcing COTS products were included in the original model but not in the new model. The new model found system (embedded and device) software domains, shrinkwrap (utility and internet) software domains, component (CASE and class library) software domains, outsourcing (specification and coding) processes, outsourcing custom/specialized software products, and total process outsourcing as indicating variables which were not included in the old model. Again, no indicating variables were found in common. These two models were similar with only 15 marks separating them, but the combined model suffered a poor 0.23 R^2. The newer model achieved higher accuracy with a R^2 value of 0.48 and less noise with a RMSE value of 1.01 thus making it the choice model to use.

4.4.3.12 Rework Consequence

The last thing that organization desired was rework especially after paying an outsourced organization money for products and processes which they found themselves having to redo. The intercept from both models showed a neutral rework outcome which would be at least equal to the amount of rework accomplished by organization not outsourcing. System (communication and device) software domains, shrinkwrap internet

software domain, enterprise scripting software domain, outsourcing reengineering process, and outsourcing COTS products proved to be indicators in the original models but not in the new models. System avionics software domain, shrinkwrap utility software domain, component development tool software domain, outsourcing application support process, and total product outsourcing saw their way into the new model but not in the old model. Outsourcing software engineer support process was found to be the only indicating variable common in both models. Outsourcing software engineer support process saw in the original model to increase this rework, but in the new model, this indicating variable was found correlated with a decrease of rework. The two models were similar with 14 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.32 and proved to have similar noise with an approximate RMSE value of 1.20. The new model was the model of choice due to the fact it did a better job explaining the outcome and was built with the latest data.

4.4.3.13 Visibility Consequence

Visibility in the development process was a goal for many organizations seeking some update about the software. The initial intercept showed a significant difference between the original and new model. The original model found that outsourcing decreased visibility whereas the new model showed a neutral amount of visibility. With the new model, outsourcing did no worse at this visibility than those organizations not outsourcing. Enterprise (order entry and website) software domains and outsourcing (design, maintenance and fielding) processes were indicating variables in the original model but not in the new model. System (avionic, embedded, and device) software

domains, shrinkwrap utility software domain, component (CASE and operating system) software domains, outsourcing (testing, specification, coding and configuration management) processes, total product outsourcing, and outsourcing customizable common products were indicating variables found in the new model but not in the original model. System communication software domain, development tools component software domain, enterprise scripting software domain, outsourcing (reengineering and software engineer support) processes, outsourcing custom/specialized products, and total process outsourcing were common indicating variables between both models. System communication software domain, outsourcing custom/specialized products, and total process outsourcing were all found to increase visibility in both models. Development tools component software domain and outsourcing software engineer support process showed to decrease visibility in original model, but in the new model, this was opposite with these variables having an increasing effect. Enterprise scripting software domain and outsourcing reengineering process showed to increase visibility in the original model, but in the new model, they found the opposite and actually decreased visibility. Given these changes, the two models were very different with 38 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.87 and proved to have less noise with a RMSE value of 0.66 making it the model of choice.

4.4.3.14 Control of Product Consequence

Controlling the product consequence referred to the ability for the organization to induce control upon a software project. This control may have needed to inject a certain degree of accuracy between the product and requirements or used to ensure the product

meets a certain safety/testing criteria. The intercept from the old model showed a neutral control outcome which would be at least equal to those organizations not outsourcing. The new model showed a complete different picture. It showed that controlling the product through outsourcing was slightly decreased. Given certain outsourcing factors, this outcome may have been raised significantly. For example, those choosing total process outsourcing would find control of product to be raised to a slightly increasing level. System device software domain, enterprise utility software domain, domain framework software component domain, outsourcing (reengineering, application support and tool support) processes, and outsourcing (COTS and customizable common) products proved to be indicators in the original models but not in the new models. Outsourcing (requirements, testing and training) processes and total process outsourcing saw their way into the new model but not in the old model. Outsourcing fielding and software engineer support processes were common indicating variables found in both models. Outsourcing fielding process had a slight decrease effect in the original model that jumped dramatically to significantly decreasing this consequence in the new model. Outsourcing software engineer support process saw in the original model to decrease this control, but in the new model, this indicating variable was found correlated with an increase of the control of the product. The two models were similar with 16 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.48 and proved to have less noise with a RMSE value of 0.99. The new model was the model of choice due to the fact it did a better job explaining the outcome and was built with the latest data.

4.4.3.15 Change Cost Consequence

Change cost consequence concerned itself with goals to reduce the dollar amount charged for changes in the software project. These changes normally resulted in change in customer requirements or hardware restrictions. Of course, the changes were not restricted to just these types alone. Both models started with an intercept placing this consequence as equal to those organizations not outsourcing. As always, this intercept could have been adjusted depending upon which indicating variables were being used. For example, using the new model, those who are practicing total product outsourcing found a significant increase in this cost, but those who were practicing total process outsourcing found a significant decrease for this consequence. Those indicating variables found in the original model but not in the new model included: system avionics software domain, shrinkwrap internet software domain, operating system component software domain, enterprise (accounting, manufacturing, order entry and website) software domains, outsourcing software engineer support process, and outsourcing COTS products. Those indicating variables found in the new model but not in the original included: shrinkwrap utility software domain, component class library software domain, outsourcing coding process, outsourcing customizable common products, and total process outsourcing. No common indicating variable were found between the models. The two models were somewhat similar with 20 marks separating them. Both models did have similar accuracy figures with a R^2 approximate value of 0.36, but the old model proved to have less noise with a RMSE value of 1.08. The new model was the model of choice due to the fact it shared the same accuracy level but was built with the latest data.

4.4.3.16 Language Culture Problem Consequence

Language/culture problems consequence referred to the risk of increasing communication problems due to a difference between organizations especially those organizations from different nations. There was a slight difference between the original and new model. The original started out with a neutral outcome meaning it was exactly the same as those who decided not to outsource. The new model, however, showed to have a slightly increase amount of these types of problems due to outsourcing. System avionics software domain, enterprise (accounting and order entry) software domains, outsourcing (requirements and software engineer support) processes, and outsourcing customizable common products were found in the original model but not in the new model. Embedded system software domain, component (domain framework and class library) software domains, enterprise payroll software domain, outsourcing (reengineering, application support, specifications and configuration management) processes and total process outsourcing were all indicator variables included in the new model but not the old model. Shrinkwrap utility software domain, operating system component software domain, outsourcing (design and fielding) processes and outsourcing custom/specialized products were common in both models. Shrinkwrap utility software domain showed an increasing effect in the old model but showed a decreasing effect in the new model. Operating system component software domain showed a small decreasing effect in old model but a significant decreasing effect in the new model. Outsourcing design process correlated with a small increasing effect in original model but a significant decreasing effect in the new model. Outsourcing fielding process saw a

small decrease in the old model but an increase in the new model. Outsourcing custom/specialized products stayed consistent with a small decrease through out both models. The two models were somewhat separated with 25 marks between them. The newer model did have higher accuracy with a R^2 value of 0.61, but the old model had less noise with a RMSE value of 0.62. The new model was the model of choice due to the fact it did a much better job explaining the outcome and was built with the latest data.

4.4.3.17 Turf War Consequence

Turf war consequence referred to the friction found between different teams striving to complete their own independent task. Teamwork in both the contractor and customer organizations was the overall goal. This consequence described the effects outsourcing had on this teamwork goal. The initial intercept showed a significant difference between the original and new model. The original model found that outsourcing kept the turf war neutral which was equivalent to those not outsourcing whereas the new model showed a slightly increased amount of turf war. Indicating variable selection such as outsourcing software engineer support process would have decrease affect on the outcome. System avionic software domain, component (class library and operating system) software domains, enterprise (accounting and manufacturing) software domains, outsourcing (reengineering, application support, specification and tool support) processes, and outsourcing COTS products were indicating variables in the original model but not in the new model. System device software domain, enterprise scripting software domain, outsourcing (design and configuration management) processes, outsourcing customizable common products, and

total process outsourcing were indicating variables found in the new model but not in the original model. System embedded software domain, shrinkwrap internet software domain, and outsourcing software engineer support process were common indicating variables between both models. System embedded software domain had a consistent increasing effect on turf war consequence. Shrinkwrap internet software domain and outsourcing software engineer support process showed to have an increasing effect in the old model and a decreasing effect in the new model. The models were different with 24 marks separating them. The older model did have higher accuracy with a R^2 value of 0.57 and proved to have less noise with a RMSE value of 0.86 making it the model of choice despite being built with older data.

4.4.3.18 Failure Likelihood Consequence

Failure likelihood consequence concerned itself with outright project failure. It was assumed by many organizations that outsourcing may be a prime reason for project failure. Figures have shown quite the opposite, and in some cases, actually decreased the chance of project failure. Both models started with an intercept placing this consequence as equal or slightly less than neutral. This would imply that those organizations not outsourcing had about the same result with project failure. Those indicating variables found in the original model but not in the new model include: system device software domain, shrinkwrap internet software domain, and outsourcing configuration management process. Those indicating variables found in the new model but not in the original include: shrinkwrap (business and utility) software domains, component class library software domain, enterprise (accounting and scripting) software domains,

outsourcing (testing, maintenance and fielding) processes, and outsourcing customizable common products. Outsourcing (requirements, reengineering, tool support and software engineer support) processes and outsourcing COTS products were common between both models. Outsourcing (requirements and reengineering) processes showed to have a decreasing effect in the old model but an increasing effect in the new model. Outsourcing (tool support and software engineer support) processes and COTS products showed to have an increasing effect in the old model but a decreasing effect in the new model. The two models were somewhat different with 28 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.75 and proved to have less noise with a RMSE value of 0.87. The new model was the model of choice.

4.4.3.19 Response to Customer Consequence

Increasing the response to the customer was a popular goal for many organizations regardless of outsourcing plans. The initial intercept showed a small difference between the original and new model. The original model found that outsourcing could slightly improve this consequence whereas the new model showed only a neutral outcome. In either case, outsourcing did no worse at this response than those organizations not outsourcing. Enterprise order entry software domain was the only indicating variable found in the original model but not in the new model. Shrinkwrap (business and internet) software domains, class library component software domain, enterprise (accounting and scripting) software domains, outsourcing (requirement, design, reengineering, training and software engineer support) processes, total product outsourcing, and total process outsourcing were indicating variables found

in the new model but not in the original model. Component domain framework software domain, outsourcing (maintenance and application support) processes, and outsourcing (custom/specialized and customizable common) products were common indicating variables between both models. Domain framework component software and outsourcing (custom/specialized and customizable common) products found to alternate from decreasing effect in the old model to increasing effect in the new model. Likewise outsourcing maintenance had an increasing effect in the old model to a decreasing effect in the new model. Outsourcing application support retained a decreasing effect throughout both models. The two models were somewhat different with 23 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.80 and less noise with a RMSE value of 0.68 thus making it the choice model to use.

4.4.3.20 Response to Organization Consequence

Response to organization consequence concerned itself with increasing the response to organization's standards and expectations. Many organizations wanted their outsourced organizations to respond to their demands rather than being influenced by other sources. Both models started with an intercept placing this consequence as equal or slightly less than neutral. This meant that those seeking response from a total in-house software development shop had similar results. Those indicating variables found in the original model but not in the new model included: enterprise order entry software domain and outsourcing (maintenance, application support and coding) processes. Those indicating variables found in the new model but not in the original included: system communication software domain, component class library software domain, shrinkwrap

utility software domain, enterprise accounting software domain, outsourcing (requirement, training and fielding) processes, and total process outsourcing. Outsourcing software engineer support process was the only common indicating variable found between both models. Outsourcing software engineer process showed to have a decreasing effect in the old model but a significant increasing effect in the new model. The two models were somewhat similar with 17 marks separating them. The newer model did have higher accuracy with a R^2 value of 0.56 and proved to have less noise with a RMSE value of 0.97. The new model was the model of choice.

4.4.3.21 SODS2 Consequence Models Summary

These models provided us an overview of the new, used, and combined data sets. With few exceptions, the new data models appeared to be more accurate by the RMSE and correlation values thus did a better job explaining the variation from response to response. By providing the user the ability to view results from all three sets, the user have a much thorough result set along with the accuracy provided by the NN's. This model quality evaluation was based on comparison of model outputs to data used to create the models. Later in this chapter's validation section, validation uses unprocessed survey data to establish external model validity.

4.4.4 Regression Model Summary

This section covered the regression model implementation in regards to the SODS2 development. The following three goals for this section were achieved:

1. Modeling technique validation,
2. Analysis on differences between models, and

3. Explanation of SODS2 consequence models.

4.5 Neural Network Implementation

The regression models provided an understandable, linear meaning to software outsourcing and its consequences. But these relationships between the input variables found in the above models were not always linear. As discussed in Chapter Two, these models along with the NN learning mechanism provided a more complete decision support tool. This section traverses the NN implementation for SODS2 by breaking it up in the following subsections.

4.5.1 Neural Network Design Portion

The Neurosolutions tool as discussed in Chapter Three was important for the design, training, testing and validation of the NN's. One of the reasons for this tool selection was its quality support staff. This research's primary Neurosolutions support representative, Mr. Gary Lynn, with over 11 years working with Neurosolutions holding a Michigan State University Computer Science Master's Degree, advised that this research use MLP with backpropagation following a function approximation architecture. This meant that the input axon for the hidden layer, a function that compresses all of the inputs into the hidden layer input, used a nonlinear tangent hyperbolic function to perform such mappings. This function provided the NN the ability to make soft non-linear decisions. Neurosolutions referred to this as the TanhAxon. The output axon (the function that messages the final output signal from the hidden layer) used a bias (linear) function. This provided the NN a degree of adaptability for the output when the NN was

forced to interpolate because of being trained with a relative low amount of training data. The learning algorithm used conjugate gradient method because from Lynn's experience this particular learning algorithm proved to be faster at training. One hidden layer was used due to the limited amount of data in regards to the high number of input variables. This NN design provided this research a solid fit given its problem according to the experts at Neurosolutions.

4.5.2 Cross Validation Portion

Data was configured and saved in a tab delimited text file for cross validation. Using this text file, Neurosolutions provided an easy graphical display for selecting input and output columns found in the file. Those columns selected for input were fed into Neurosolutions as input variables, and those columns selected for output were fed as output variables. A randomization function allowed the data rows to be fully randomized. This was highly recommended by Lynn to help destroy all possible order found within the data sets so that such order did not interfere with training. Selecting cross validation sets as mentioned in Chapter Two was also provided through graphical displays. Neurosolutions would break the rows down into percentages to allow the selection of such cross validation data. During actual training, the tool used these probe hooks for displaying the progress of the training versus cross validation. The NN performance measurements (specifically the Mean Square Error (MSE) and Correlation (R) Value) provided accuracy measure for the NN against both the training and cross validation data set. The data graph that compared the training MSE line with the cross validation MSE line proved most useful. This data graph copied exactly the intent behind

Figure 18 MLP NN Training Error Plot [39]. Appendix E contains the screen shots from Neurosolutions taken after each consequence cross validation. The performance measures and error plots (along with the basic graphical design of the NN) were captured within each screen shot.

4.5.3 Neural Network Data Problem

Upon review of the cross validation data and associated performance measurements, a problem was quickly noticed. Due to the limited number of available data and a pre-existing interpolation problem as discussed in the regression models, the cross validation data needed to somehow be included within the training data. Comparing all cross validation screen shots, it was reasonable to believe that overtraining could be kept low by stopping training at 50 epochs. By averaging out the cross validation/over-training minimum epoch point for each error plot, one could assure that overtraining would be minimized if training was stopped at the research average of 50 epochs. Lynn verified that this was a sound methodology for solving my interpolation problem caused by having a small amount of training data.

4.5.4 Neural Network Training Without Cross Validation Portion

Applying such methodology meant that this research retrained each NN with all rows of data added. During this retraining, the training data set performance measurement probe hook provided the NN accuracy information and using a new data graph probe hook for comparing the actual survey outputs vs. NN estimated outputs demonstrated a nice overview of the NN training. These values and graphs were placed

in the screen shots included in Appendix F. One Neurosolutions' learning hurdle dealt with the way the tool saved its weight files. Unless configured correctly, it would save dynamically the best weights associated with a history of training runs. This caused a problem when the goal was to capture the training screen shot with the weights currently used within the NN. By explicitly saving the initial weight files along with the final weight files, the training episode associated with a given screen shot could be reproduced. This information was from the excellent help support staff there at Neurosolutions and a crucial discovery that made building these NN that much easier.

4.5.5 Neural Network Interface Portion

With the above methodology for building NN in place, 20 NN were reasonably designed and trained. The only remaining portion dealt with interfacing the 20 NN with SODS2 during run time. As previously documented, one of Neurosolutions' most beneficial features, was the ability for it to create 20 DLL's and associated weight files using the MS Visual C++ compiler version 5.0 to 7.0. The author used the MS Access VB sample shell provided by Neurosolutions to understand how SODS2 would connect to these DLL files.

4.5.6 NN Implementation Summary

Twenty consequence NN's were designed, trained and created by the Neurosolutions under the expert guidance of Lynn. The interfacing portion used this tool to create 20 DLL files. These DLL files would allow MS Access VB to interface directly

with the 20 NN's. At this point with the NN's and models built, attention was turned to the development of SODS2.

4.6 SODS2 Implementation

This implementation section covered building the actual SODS2 application. This phase of the implementation will be broken into the following seven subphases.

4.6.1 SODS2 Development Tool

During the NN interfacing portion, this researcher was happy to discover that the Neurosolutions DLL files could actually be called from inside MS Access. This caused yet another change in methodology because the plan was to use Togethersoft Java in SODS2 development. By using MS Access VB as the developer's platform, MS Access would not only be used to store and organize the data, but would house the application along with this data. This promised an easier fielding of the application and less configuration management headaches. The disadvantage of this decision was that MS Access VB lacked the maintainability and software evolution that would have been offered through a fully dependent programming language such as Java, but this research found that software outsourcing was rapidly changing so the lifespan of such application would be a few years at most.

Using MS Access VB, the application was built meeting all the high level requirements found in Table 26. A more detailed outline of the SODS2 windows were included in Appendix I which showed how each requirement was incorporated in the SODS2 tool.

4.6.2 SODS2 Validation Phase

The SODS2 validation consisted of 120 scenarios created from six new survey responses gathered since the release of this research analysis data. Due to the fact these responses were not used in the formulation of either the regression models or NN's, unbiased results were captured. SODS2 validation used its scenario results from the New Data Regression (NDR), Old Data Regression (ODR), and Combined Data Regression (CDR) models along with results from the NN learning mechanism. These results were then compared against the actual survey responses. Figure 41 illustrated such comparisons as it relates to the cost consequence.

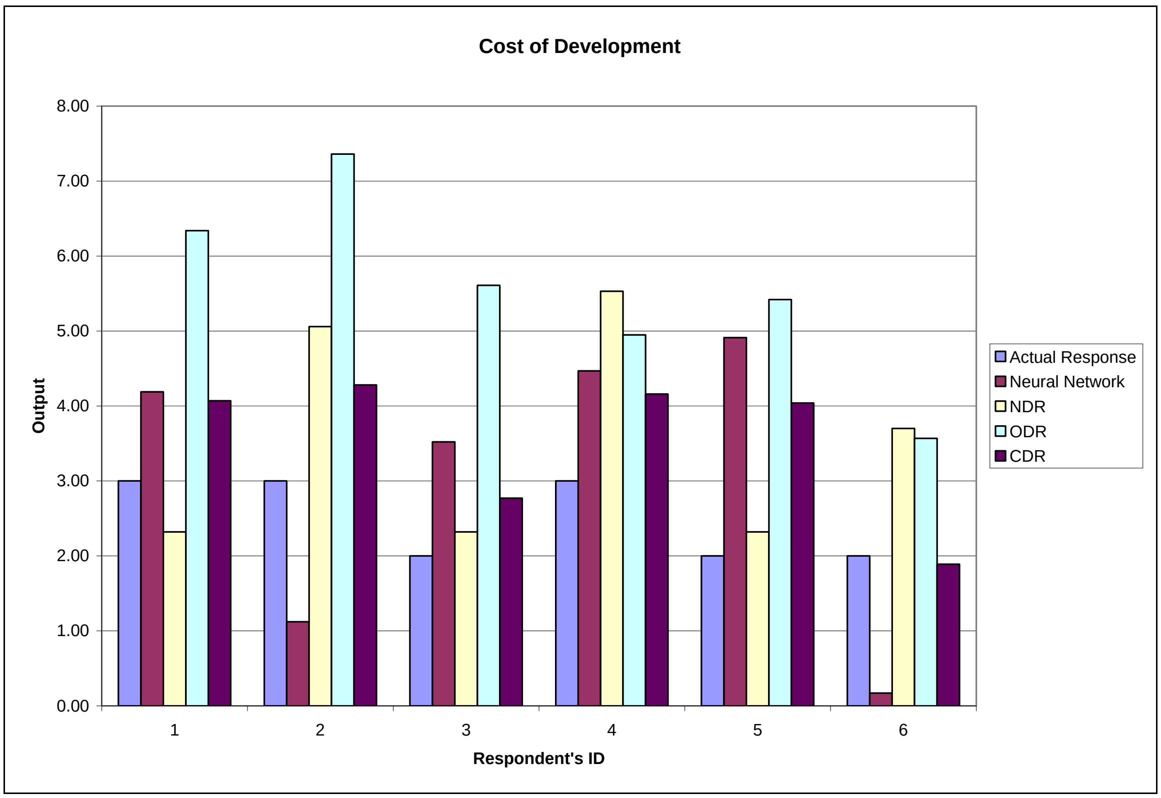


Figure 41 Validation Sample

This chart was created from the following data found in Table 28.

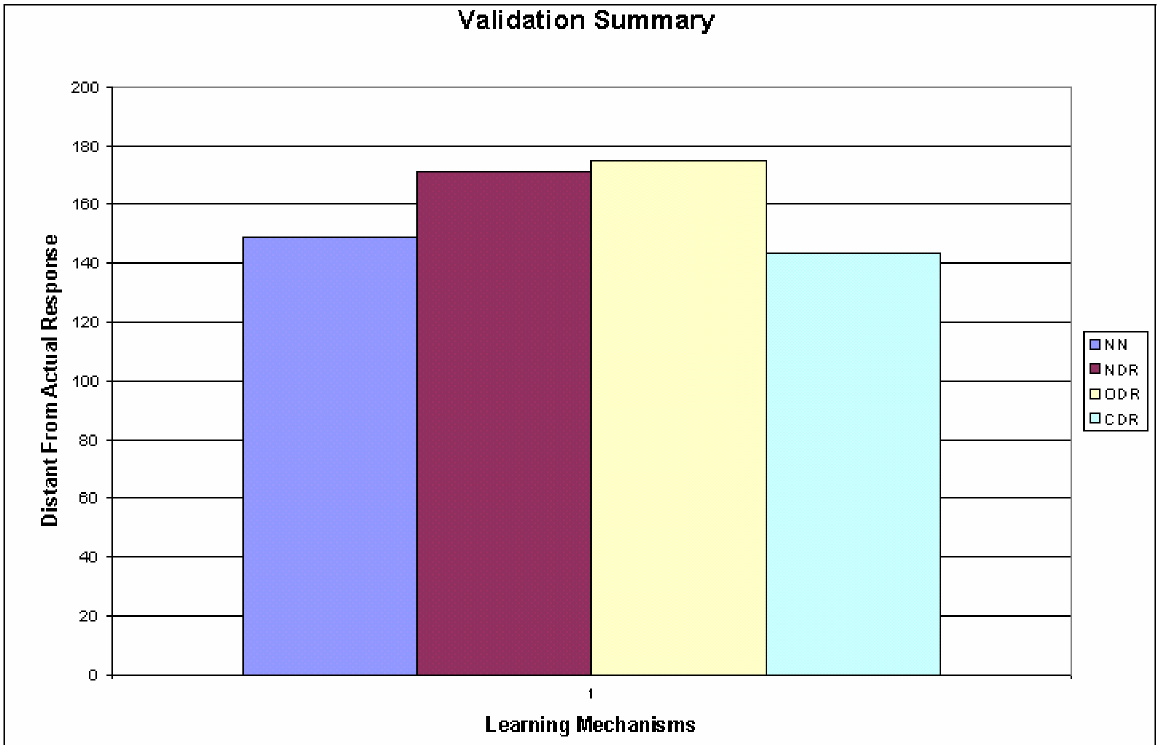
Table 28 Validation Sample Table

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	3.00	4.19	2.32	6.34	4.07	1.19	0.68	3.34	1.07
2	3.00	1.12	5.06	7.36	4.28	1.88	2.06	4.36	1.28
3	2.00	3.52	2.32	5.61	2.77	1.52	0.32	3.61	0.77
4	3.00	4.47	5.53	4.95	4.16	1.47	2.53	1.95	1.16
5	2.00	4.91	2.32	5.42	4.04	2.91	0.32	3.42	2.04
6	2.00	0.17	3.70	3.57	1.89	1.83	1.70	1.57	0.11
Total Difference (Neural Network):						10.80			
Total Difference (New Data Regression):							7.61		
Total Difference (Old Data Regression):								18.25	
Total Difference (Combined Data Regression):									6.43

This sample illustrated each respondent’s (one through six) actual responses compared to the estimated outputs calculated with each learning mechanism. The distance from the actual response and each output was calculated and inserted in each of the Differences (Diff.) columns. Then these distances were summed together at the bottom of the sample’s tables resulting in the total difference. This was graphically illustrated in the sample’s chart. In respondent’s one cost scenario, the NDR performed the best in actually predicting the outcome while in respondent’s six cost scenario, the NDR performed the worst. All 120 scenarios were included in Appendix H.

After the 120 scenarios, a summarization was calculated from the total differences and inserted at the end of Appendix H. CDR slightly edge NN for best performance on these six data points. NDR and ODR were similarly close with significantly worse

performance. Interpolating effects due to the small amount of data used in building the NDR and ODR probably accounted for this performance. Another indicator of interpolation was the extreme estimates of greater than seven or less than one. The results of this summary were listed in Figure 42.



NN	NDR	ODR	CDR
148.81	171.2	175.01	143.46
2nd	3rd	4th	1st

Figure 42 Validation Summary

Each learning mechanism performed reasonably well given the limited amount of data this research used to build all four mechanisms. This overall performance, as illustrated above, was well within the expectations of this research. The NN and CDR used all the training data captured in the combined survey data set; thus, proved to outperform the NDR and ODR even though these models showed better overall

performance within their own data sets. The driving push behind such results was the importance of capturing as much data as possible over a wide range of possible scenarios. This should help alleviate interpolation effects. Though NDR and ODR fell shortly behind, all resulting learning mechanisms' performances were reasonably accurate given such fluctuation in the validation survey set. SODS2 met this validation criteria in two different ways: 1) SODS2 learning mechanisms' performance measures provided decent estimated outputs, and 2) SODS2 performed brilliantly in processing the output for the 120 validating scenarios that used several, varying input combinations.

4.6.3 SODS2 Implementation Summary

This section covered the SODS2 implementation steps. Each of the seven sub-phases linked to a subset of requirements laid out in the methodology. The tool was built with MS Access VB with the intent of providing a user friendly, window type application. The point and click input features and associated help tags gave the user an efficient interface to enter their respective software outsourcing input parameters and navigate to viewing the associated reports. The reports were broken into an easy to decipher scale providing the user the predicted outcomes based upon their input selections.

This application was validated with the newest survey data yet to be inserted into either of the SODS2 learning mechanisms. This survey data allowed the creation of 120 scenarios based upon what the respondent might have entered given access to SODS2. By comparing these actual outputs with the SODS2 learning mechanisms' estimated outputs, one could see how this decision support tool would have performed given such

survey respondents inputs compared to real world output. The SODS2 learning mechanisms were highly adaptable at estimating such outputs. At this stage, SODS2 was completed and all associated requirements were fully met.

4.7 Summary

This chapter described the implementation results for this research. This effort began with the transport of new data into the MS Access database housing the previous collected survey data. The data was then analyzed using statistical methods such as T-testing and regression model building. Numerous differences with only a small amount of similarities were found between the old and new surveys. The analysis continued with the creation of the regression models. After the modeling techniques were validated and used to create the goal realization models, differences were again noticed from the old survey data goal realization models created in Hermann's dissertation and the new goal realization models created in this research. With these differences and a change in the stepwise entry/removal statistics, this research proceeded in creating 60 consequence regression models from the new, used and combined data sets. From the creation of these models, the attention turned toward the NN implementation phase. Neurosolutions tool along with its expert support staff provided this research properly designed and trained NN for each consequence. The tool also paved the way for interfacing with SODS2 by means of DLL files. With the NN's and models built, the SODS2 implementation was initiated. SODS2 was successfully built with all requirements fully achieved and validated with 120 scenarios.

5. Conclusion and Future Work

5.1 Introduction

This chapter will summarize this research along with providing conclusions and suggestions for future work. The results will sum up the contributions brought forth by this work. After these contributions are summarized, this chapter concludes with a vision for future work.

5.2 Conclusions and Contributions

Many new discoveries were noted along the way in developing Software Outsourcing Decision Support tool version 2 (SODS2). The first discovery came through the analysis of the new survey data. It was previously assumed that this data would share many common similarities with a sprinkling of differences between the analysis and consequence rules used in Hermann's first version of the tool (SODS1). This was hardly the case. These differences slightly repositioned this research's methodology. Instead of building the 20 stepwise regression consequence models from only the combined survey data, now, they should be built using all three sets of survey data, the new, used and combined totaling 60 regression models. Discovering the fact that outsourcing experience is rapidly changing in a significant positive way was this research's first contribution.

The next major discovery dealt with creating a new methodology for extending the current SODS1 decision support tool to allow the addition of neural network technology. Because of the accuracy that neural network technology promised to the SODS2 user, a

change in the stepwise entrance / removal statistics from 95% / 90% confidence level to 75% / 75% confidence level was allowed. Expanding this stepwise entrance / removal statistics caused dramatic inclusions of new variables into all 60 regression models used by SODS2. This change improved the understandability about the consequence outputs as they relate to even a greater number of variables selected for insertion into the models. However, with this expansion of the stepwise entrance / removal statistics, more noise was allowed into the new models so neural networks had to be used to provide SODS2 users the needed accuracy. This meant that this research designed and employed a new methodology for adding neural networks along with the regression models to the SODS2 tool. As a result of such methodology, 20 Multi-Layer Perceptron (MLP) with backpropagation neural networks were designed and verified by a notable neural network expert. New methods for applying cross validation to minimize the amount neural network overtraining and overfitting were also designed and applied. These new methods allowed the neural network to be trained with all of the collected input data, but by stopping the training based upon an average epoch calculated during cross validation, overtraining and overfitting were minimized. Such neural network training methods were reviewed and verified by Lynn. As a result, these 20 neural networks provided the accuracy as promised with a decent ability of explaining the varying combined survey outputs. This SODS2 addition, of using neural network artificial intelligence along with the three separate sets of regression models, provided outsourcing decision makers an in-depth consequence output regarding their proposed outsourced project. This new SODS2

methodology for adding neural networks with their associated changes was this research's second major contribution.

With the new methodology designed, this research proceeded to build and validate SODS2. During the development of the tool, much of the focus was on making it user friendly. Building the application inside the MS Access survey database provided the user an easy all-in-one portable tool. SODS2 development language, MS Access Visual Basic, provided the means for adding a window graphical interface with point / click type inputs. User tool guidance was included through help labels and smart description tags. The requirements shown in Chapter Three's Table 26 were fully met by SODS2.

After successful completion of SODS2, recent survey data was collected from the internet which was used to generate 120 scenarios for SODS2 validation. Such survey data was not used in the creation of the regression models nor the neural networks; therefore, providing an unbiased validation result set for this research. Each SODS2 learning mechanism, Neural Networks (NN), New Data Regression (NDR), Old Data Regression (ODR), and Combined Data Regression (CDR), aligned their estimates fairly favorable to each of the scenario's actual output as noted in Appendix H. NN and CDR were evenly matched with the best overall performance while NDR and ODR had similar performance and were not far behind. Such performances resulted from interpolation problems due to the amount of data used to create NDR and ODR versus the amount of data used to create NN and CDR. Such validation results showed the value that SODS2 could provide to a outsourcing software decision maker. With the SODS2 built and validated, a third and important contribution was added to this field of study.

5.3 Future Work

During the development of SODS2, over 128 regression consequence and goal realization stepwise regression models were created and analyzed. The new survey data and models were analyzed and compared against the findings presented in Hermann's dissertation. As previously discussed, the real world software outsourcing knowledge was found to be changing. Ongoing analysis of survey data will be paramount for the evolution of software outsourcing knowledge. In attempts to provide such analysis, enhancements to the online survey will be the first crucial step in capturing this knowledge. The survey response Likert scale can be adapted so that a graphical continuous scale can be used in its replacement; much like the scale used to adjust a computer's volume. This would allow the survey respondents to slide the graphical slider to real data type values between the whole numbers of one through five or one through seven respectively. Along with this improvement, additional changes to the survey could provide respondents an opportunity to add survey responses concerning their most vivid, worst, and/or successful software outsourcing project experiences. The goal with this change is the attempt to capture as much information from the user as possible. Another important survey change deals with changing software domain flags as categorical type input versus specific type input. Reducing the number of input variables should increase the accuracy of both the regression models and neural networks. In light of this, unfortunately, additional flags may be required to capture future software outsourcing trends such as Application Service Providers and/or outsourcing partnerships. Given

such changes, the drive for this future work will be to collect as much software outsourcing data using an revised online survey tool.

Due to the increase of such new survey data, future experimentation may be created to isolate the first cause and effect software outsourcing relationship. This research was purely observational with only opinions offered for the observed software outsourcing occurrences. Experimentation might concentrate on a very small subset of an outsourcing type and research to see if a cause and effect relationship can be found. While the over-arching observational tendencies have been documented, very little or possibly no work has ever attempted to study the cause and effect of a particular subset of software outsourcing.

Future efforts must also be spent on enhancing SODS2 to be more dynamic. Neurosolutions using neural network technology can be used to allow a SODS2 user the ability to accept a constant flow of incoming new neural network and stepwise regression update packages. This enhancement would function much like the antivirus software found on many computers. Once a considerable amount of surveys are collected, an auto-updating SODS server will need to be created. Its purpose includes:

1. Automate the regression model and neural network creation with reports providing a summary of the changes between the regression models and neural networks,
2. Allow the user version of SODS to automatically pull new model and neural network packages from this new server by means of the internet, and
3. Provide online communications for SODS users informing them about new updates and associated analysis reports, giving them a medium to voice their opinion.

The goals for this tool would not really change, but the process of capturing, codifying and evolving software outsourcing knowledge would be greatly enhanced.

BIBLIOGRAPHY

[1] T. Nonaka, *The Knowledge Creating Company*: Oxford University Press, 1995.
[2] P. Coyle, "Simulation Based Acquistion for Information Technology," presented at 1999 ITEA - GW Conference, Fairfax, VA, 1999.
[3] Cable News Network, "Ariane 5 Blasts Off in Crucial Launch," 1997.
[4] L. Mosemann, "Did We Lose Our Religion?," *Crosstalk the Journal of Defense Software Engineering*, vol. Aug 2002.
[5] K. Lunney, "Bush Praises Top Executives, Pushes Outsourcing," in *Government Executive*, 2001.
[6] D. Rumsfeld, "Secretary Rumsfeld Briefs the Fiscal 2003 DoD Budget," United States Secretary of Defense 04 Feb 2002.
[7] W. Washington, "Outsourcing Automatic Data Processing Requirements and Support," in *Acquisition Review Quarterly*, vol. Spring 1999.
[8] C. Jones, "Defense Software Development in Evolution," *Crosstalk the Journal of Defense Software Engineering*, vol. Nov 2002.
[9] L. Mosemann, "New Air Force Policy on Artificial Intelligence," USAF Deputy Assistant Secretary 3 Feb 1994.
[10] W. Power, "Application of Corporate Outsourcing Methods to the Department of Defense," in *Administration and Management*. Monterey, CA: Naval Postgraduate School, 2000, pp. 101.
[11] B. Hermann, "A Decision Support Tool to Support Strategy Selection for Software Development Outsourcing," in *Computer Science*: Arizona State University, 2000, pp. 250.
[12] P. Tinnirello, "New Directions in Project Management," in *Best Practices Series*: Auerbach Publication, 2002.
[13] R. Abbas, P. Dart, E. Kazmierczak, and F. O'Brien, "Outsourcing Software Applications Development: Issues, Implications, and Impact," University of Melbourne Dec 1997.
[14] J. Butler, "Winning the Outsourcing Game," Auerbach Publications, 2000.
[15] K. Ketler and J. Willems, "A Study of the Outsourcing Decision: Preliminary Results," presented at 1999 ACM SIGCPR Conference on Computer Personnel Research, New Orleans, Louisiana, 1999.
[16] J. Statz and M. Epner, "Who's Right on Intellectual Property?," *Cutter IT Journal*, vol. 13, 2000.
[17] C. Jones, "Build, Buy or Outsource?," *Computer IEEE*, vol. Dec 1994, 1994.
[18] S. Ang and S. Slaughter, "Organizational Psychology and Performance in IS Employment Outsourcing and Insourcing," presented at 31st Annual Hawaii International Conference on System Sciences, Hawaii, 1998.
[19] C. Beath and G. Walker, "Outsourcing of Application Software: A Knowledge Management Perspective," presented at 31st Annual Hawaii International Conference on System Sciences, Hawaii, 1998.

[20] L. Fischman and K. McRitchie, "Off the Shelf Software: Practical Evaluation," *Crosstalk the Journal of Defense Software Engineering*, 2000.

[21] R. Gardner, "The Software Solution for the E-Business Enterprise: Vendor or Partner?," Codehost Inc. Apr 2001.

[22] D. Avison and G. Fitzgerald, "Where Now for Development Methodologies," *Communications of the ACM*, vol. 46, 2003.

[23] R. Heeks, S. Krishna, B. Nicholson, and S. Sundeep, "Synching or Sinking: Global Software Outsourcing Relationships," *IEEE Software*, vol. March/April 2001.

[24] J. Herbsled and A. Mockus, "An Empirical Study of Speed and Communication in Globally Distributed Software Development," *IEEE Transaction on Software Engineering*, vol. 29, 2003.

[25] G. Kingston, J. Ross, and W. Huang, "An Explanatory Study on the Goal Alignment Problem in Joint Software Reviews," Commonweath of Australia 2000.

[26] D. Kotchman, "Achieving SA-CMM Level 2 at PM Abrahams," *Crosstalk the Journal of Defense Software Engineering*, vol. Aug 2002.

[27] N. Kobitzsch and D. Rombach, "Outsourcing in India," *IEEE Software*, vol. March/April 2001.

[28] A. Dutoit, J. Johnstone, and B. Bruegge, "Knowledge Scouts: Reducing Communication Barriers in a Distributed Software Development Project," *IEEE*, 2001.

[29] J. Pelrine, "Modelling Infection Scenarios - A Fixed-Price Extreme Programming Success Story," presented at Conference on Object Oriented Programming Systems Languages and Applications, Minneapolis, MN, 2000.

[30] A. Rollo and T. Wright, "A Method for Acquiring Custom Built Software or Let the Customer Manage Software Acquisition," presented at 12th Annual European Software Control and Metrics Conference, London, England, 2001.

[31] M. Orsted, "Software Development Engineer in Microsoft: A Subjective View of Soft Skills Required," presented at 22nd International Conference on Software Engineering, Limerick, Ireland, 2000.

[32] J. Gyorkos, A. Novakovic, I. Rozman, R. Leskovar, and R. Vajde-Horvat, "Decision Knowledge Gathering in Outsourced Projects," *IEEE*, 1999.

[33] N. Gaudiano, "Air Force Retracts $1 Billion from Boeing Deal," in *Air Force Times*, 2003.

[34] R. Patnayakuni and N. Seth, "Why License When You Can Rent? Risks and Rewards of the Application Service Provider Model," presented at Special Interest Group on Computer Personnel Research 2001 Annual Conference, San Diego, CA, 2001.

[35] A. Susarla, A. Barua, and A. Whinston, "Myths About Outsourcing to Application Service Providers," *IT Pro*, vol. May-Jun 2001.

[36] S. Lee, K. Huynh, K. Chi-wai, and S. Pi, "The Evolution of Outsourcing Research: What Is the Next Issue?," presented at 33rd Hawaii International Conference on System Sciences, Hawaii, 2000.

[37] StatSoft_Inc, "Building Models via Stepwise Regression," 2003.

[38] J. Principe, N. Euliano, and W. Lefebvre, *Neural and Adaptive Systems*, 1st Edition ed: John Wiley and Sons, Inc., 2000.

[39] L. Tarassenko, *A Guide to Neural Computing Applications*. London: Arnold Publishers, 1998.

[40] L. Smith, "An Introduction to Neural Networks," University of Stirling 25 October 1996.

[41] W. Sarle, "Comp.ai.neural-nets FAQ, Part 1 of 7: Introduction," Cary, NC 2002.

[42] K. Smith and J. Gupta, "Neural Networks in Business: Techniques and Applications for the Operation Researcher," *Computer and Operation Research*, vol. 27, 2000.

[43] M. Tafti, "Neural Networks: A New Dimension in Expert Systems Applications," presented at 1990 ACM SIGBDP Conference on Trends and Directions in Expert Systems, Orlando, FL, 1990.

[44] M. Nasereddin and M. Mollaghasemi, "The Development of a Methodology for the Use of Neural Networks and Simulation Modeling in System Design," presented at 1999 Winter Simulation Conference, Phoenix, AZ, 1999.

[45] R. Sharda and R. Rampal, "Neural Networks and Management Science/Operations Research: A Bibliographic Essay," *Encyclopedia of Library and Information Science*, vol. 61, 1998.

[46] R. Kilmer, A. Smith, and L. Shuman, "Computing Confidence Intervals For Stochastic Simulation Using Neural Network Metamodels," US Army Knowledge Engineering Group April 1998.

[47] D. Coit, B. Jackson, and A. Smith, "Neural Network Open Loop Control System for Wave Soldering," *Journal of Electronic Manufacturing*, vol. 11, 2002.

[48] L. Zhou, E. Gao, and P. Jin, "Comparison Between the Logistic Regression and Back Propagation Neural Networks," Shanghai Medical University Nov 1997.

[49] D. Nguyen and D. Kira, "On a Unified Framework for Building Neural Network Expert Systems," presented at 27th Annual Proceedings of the Western Decision Sciences Institute, Reno, NV, 1998.

[50] S. Lam and A. Smith, "Cascade-Correlation Neural Network Modeling of the Abrasive Flow Machining Process," University of Pittsburgh 1998.

[51] D. Faraggi, M. LeBlanc, and J. Crowley, "Understanding Neural Networks Using Regression Trees: An Application to Multiple Myeloma Survival Data," *Statistics in Medicine*, vol. 20, 2001.

Appendix A - Validation Goal Realization Models

The following two models validate this research's JMP modeling techniques against the techniques exercised during Hermann's dissertation to ensure both techniques are the same:

Stepwise Fit - Old Survey Data - Goal Realizations (Response to Organization)

Response:
Column 53

Stepwise Regression Control

Prob to Enter 0.050
Prob to Leave 0.100

Direction:

Rules:

Current Estimates

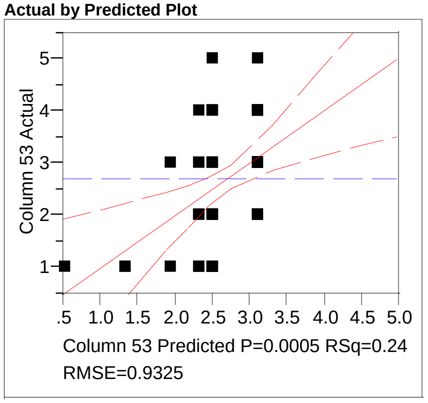
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
56.525847	65	0.8696284	0.2382	0.2031	-4.692347	-5.75919

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	1.81216578	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.094899	0.108	0.7439
		whattypesystemsembedded{0-1}	0	1	0.187166	0.213	0.6463
		whattypesystemscommunications{0-1}	0	1	0.097644	0.111	0.7404
	X	whattypesystemsdevice{0-1}	0.58890374	1	6.222779	7.156	0.0094
		whattypeshrinkbusiness{0-1}	0	1	0.378797	0.432	0.5135
		whattypeshrinkutilities{0-1}	0	1	0.085522	0.097	0.7565
		whattypeshrinkinternet{0-1}	0	1	2.145915	2.526	0.1169
		whattypecomponentdomain{0-1}	0	1	0.919992	1.059	0.3073
		whattypecomponentCASE{0-1}	0	1	1.104542	1.276	0.2630
		whattypecomponentclass{0-1}	0	1	0.021969	0.025	0.8752
		whattypecomponentOS{0-1}	0	1	0.067513	0.077	0.7829
		whattypecomponentdevelopment{0-1}	0	1	0.425571	0.485	0.4885
		whattypeenterpriseacctng{0-1}	0	1	0.099378	0.113	0.7382
		whattypeenterprisemanufact{0-1}	0	1	0.254533	0.289	0.5924
		whattypeenterprisepayroll{0-1}	0	1	0.021969	0.025	0.8752
		whattypeenterpriseOES{0-1}	0	1	3.009277	3.599	0.0623
		whattypeenterprisescripting{0-1}	0	1	0.49241	0.562	0.4560
		whattypeenterpriseweb{0-1}	0	1	0.073168	0.083	0.7743
		whatprocessrequirements{0-1}	0	1	0.372773	0.425	0.5169
		whatprocessdesign{0-1}	0	1	0.326579	0.372	0.5441
		whatprocesstesting{0-1}	0	1	0.659481	0.755	0.3880
		whatprocessmaintenance{0-1}	0	1	0.905359	1.042	0.3113
		whatprocessreengineering{0-1}	0	1	2.336888	2.760	0.1015
		whatprocessappsuppt{0-1}	0	1	0.690519	0.791	0.3770
		whatprocesstraining{0-1}	0	1	1.58186	1.843	0.1794
		whatprocessspecification{0-1}	0	1	0.010011	0.011	0.9155
		whatprocessdocumentation{0-1}	0	1	0.027099	0.031	0.8615
	X	whatprocesscoding{0-1}	-0.3961676	1	4.711611	5.418	0.0231
		whatprocessfielding{0-1}	0	1	0.848116	0.975	0.3272
		whatprocessCM{0-1}	0	1	0.341952	0.390	0.5348
		whatprocesstoolsuppt{0-1}	0	1	0.001773	0.002	0.9644
	X	whatprocessSWEngSuppt{0-1}	0.30481283	1	5.345948	6.147	0.0158
		whatproductscustom{0-1}	0	1	0.112019	0.127	0.7226
		whatproductsCOTS{0-1}	0	1	0.474052	0.541	0.4646
		whatproductscommoncust{0-1}	0	1	1.239521	1.435	0.2354
		whatproductsnone{0-1}	0	1	0.108289	0.123	0.7271

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypesystemsdevice{0-1}	Entered	0.0029	9.252899	0.1247	-0.301	2
2	whatprocessSWEngSuppt{0-1}	Entered	0.0496	3.712542	0.1747	-1.999	3
3	whatprocesscoding{0-1}	Entered	0.0231	4.711611	0.2382	-4.692	4

Response Column 53
Actual by Predicted Plot



Summary of Fit

RSquare	0.238226
RSquare Adj	0.203067
Root Mean Square Error	0.932539
Mean of Response	2.710145
Observations (or Sum Wgts)	69

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	17.677052	5.89235	6.7757
Error	65	56.525847	0.86963	Prob > F
C. Total	68	74.202899		0.0005

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	2	0.470291	0.235146	0.2643
Pure Error	63	56.055556	0.889771	Prob > F
Total Error	65	56.525847		0.7686
				Max RSq
				0.2446

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.3097148	0.315128	7.33	<.0001
whattypesystemsdevice[1-0]	-1.177807	0.4403	-2.68	0.0094
whatprocesscoding[1-0]	0.7923351	0.340401	2.33	0.0231
whatprocessSWEngSuppt[1-0]	-0.609626	0.245877	-2.48	0.0158

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Whattypesystemsdevice	1	1	6.2227790	7.1557	0.0094
Whatprocesscoding	1	1	4.7116115	5.4180	0.0231
whatprocessSWEngSuppt	1	1	5.3459482	6.1474	0.0158

RlzResponseOrg = 2.31 + (-1.18)sys-device + (-.61)proc-SWEngSup + (.79)proc-coding

Exact formula included in dissertation [11].

For additional confidence, revalidate it a second time with a different goal realization:

Stepwise Fit - Old Survey Data - Goal Realizations (Response to Customer)

Response:
Column 53

Stepwise Regression Control

Prob to Enter	0.050
Prob to Leave	0.100

Direction:

Rules:

Current Estimates

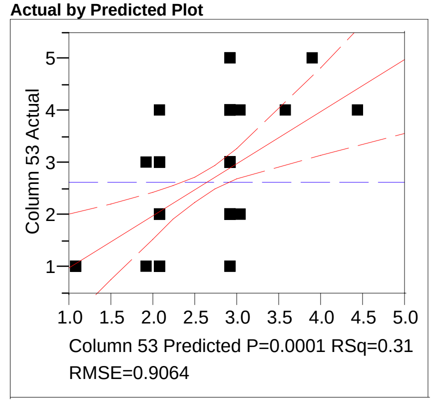
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
50.113114	61	0.8215265	0.3134	0.2684	5.0181432	-8.17455

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	3.22599671	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.483542	1	3.299417	4.016	0.0495
		whattypesystemsembedded{0-1}	0	1	0.732816	0.890	0.3491
		whattypesystemscommunications{0-1}	0	1	0.039665	0.048	0.8282
	X	whattypesystemsdevice{0-1}	0.50514003	1	4.534135	5.519	0.0221
		whattypeshrinkbusiness{0-1}	0	1	0.017865	0.021	0.8842
		whattypeshrinkutilities{0-1}	0	1	0.000048	0.000	0.9940
		whattypeshrinkinternet{0-1}	0	1	1.489246	1.838	0.1803
		whattypecomponentdomain{0-1}	0	1	1.277158	1.569	0.2152
		whattypecomponentCASE{0-1}	0	1	0.297152	0.358	0.5519
		whattypecomponentclass{0-1}	0	1	1.258009	1.545	0.2187
		whattypecomponentOS{0-1}	0	1	0.080823	0.097	0.7566
		whattypecomponentdevelopment{0-1}	0	1	0.414954	0.501	0.4818
		whattypeenterpriseacctng{0-1}	0	1	0.071278	0.085	0.7710
		whattypeenterprisemanufact{0-1}	0	1	0.005279	0.006	0.9369
		whattypeenterprisepayroll{0-1}	0	1	1.258009	1.545	0.2187
	X	whattypeenterpriseOES{0-1}	-0.7524053	1	4.343437	5.287	0.0249
		whattypeenterprisescripting{0-1}	0	1	0.21359	0.257	0.6142
		whattypeenterpriseweb{0-1}	0	1	0.059232	0.071	0.7908
		whatprocessrequirements{0-1}	0	1	0.437746	0.529	0.4700
		whatprocessdesign{0-1}	0	1	0.034148	0.041	0.8404
		whatprocesstesting{0-1}	0	1	0.71897	0.873	0.3538
		whatprocessmaintenance{0-1}	0	1	0.197592	0.238	0.6278
		whatprocessreengineering{0-1}	0	1	0.70859	0.861	0.3573
		whatprocessappsuppt{0-1}	0	1	0.20126	0.242	0.6246
		whatprocesstraining{0-1}	0	1	0.013362	0.016	0.8998
		whatprocessspecification{0-1}	0	1	0.165089	0.198	0.6577
		whatprocessdocumentation{0-1}	0	1	1.326795	1.632	0.2064
		whatprocesscoding{0-1}	0	1	1.586029	1.961	0.1666
		whatprocessfielding{0-1}	0	1	2.140979	2.678	0.1070
		whatprocessCM{0-1}	0	1	0.061198	0.073	0.7874
		whatprocesstoolsuppt{0-1}	0	1	1.011529	1.236	0.2707
	X	whatprocessSWEngSuppt{0-1}	0.42454695	1	9.945977	12.107	0.0009
		whatproductscustom{0-1}	0	1	0.026689	0.032	0.8587
		whatproductsCOTS{0-1}	0	1	0.32977	0.397	0.5308
		whatproductscommoncust{0-1}	0	1	0.830003	1.010	0.3188
		whatproductsnone{0-1}	0	1	0.866997	1.056	0.3082

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0028	9.585455	0.1313	15.196	2
2	whattypesystemsdevice{0-1}	Entered	0.0119	6.107857	0.2150	9.7586	3
3	whattypeenterpriseOES{0-1}	Entered	0.0378	3.879006	0.2682	7.0355	4
4	whattypesystemsavionics{0-1}	Entered	0.0495	3.299417	0.3134	5.0181	5

Response Column 53
Actual by Predicted Plot



Summary of Fit

RSquare	0.313376
RSquare Adj	0.268352
Root Mean Square Error	0.906381
Mean of Response	2.651515
Observations (or Sum Wgts)	66

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	4	22.871735	5.71793	6.9601
Error	61	50.113114	0.82153	Prob > F
C. Total	65	72.984848		0.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	3	2.106703	0.702234	0.8484
Pure Error	58	48.006410	0.827697	Prob > F
Total Error	61	50.113114		0.4731
				Max RSq
				0.3422

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.9197364	0.141338	20.66	<.0001
whattypesystemsavionics[1-0]	0.967084	0.482566	2.00	0.0495
whattypesystemsdevice[1-0]	-1.01028	0.430037	-2.35	0.0221
whattypeenterpriseOES[1-0]	1.5048105	0.654449	2.30	0.0249
whatprocessSWEngSuppt[1-0]	-0.849094	0.24403	-3.48	0.0009

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	3.2994168	4.0162	0.0495
whattypesystemsdevice	1	1	4.5341346	5.5192	0.0221
whattypeenterpriseOES	1	1	4.3434369	5.2870	0.0249
whatprocessSWEngSuppt	1	1	9.9459772	12.1067	0.0009

RlzResponseCust = 2.92 + (-.85)proc-SWEngSup + (1.50)ent-OES + (.97)sys-avia + (-1.01)sys-dev

Again, exact formula included in dissertation [11].

Given the number of indicator variables of both formulas, there is an extremely high confidence that these modeling methods are exactly the same as those practiced during the dissertation.

Appendix B - New Survey Data Consequence Models

Stepwise Fit - New Survey Data - Consequences (Cost)

Response:
Column 39

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

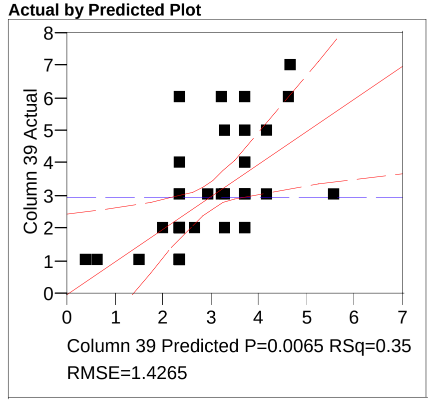
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
79.357834	39	2.0348162	0.3547	0.2554	-13.95063	39.08499

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.08493921	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	1.009938	0.490	0.4883
		whattypesystemsembedded{0-1}	0	1	0.38648	0.186	0.6687
	X	whattypesystemscommunications{0-1}	-0.4699771	1	6.932706	3.407	0.0725
		whattypesystemsdevice{0-1}	0	1	0.054901	0.026	0.8720
		whattypeshrinkbusiness{0-1}	0	1	0.626525	0.302	0.5856
		whattypeshrinkutilities{0-1}	0	1	0.078013	0.037	0.8477
		whattypeshrinkinternet{0-1}	0	1	2.002562	0.984	0.3276
		whattypecomponentdomain{0-1}	0	1	1.046793	0.508	0.4804
	X	whattypecomponentCASE{0-1}	1.66493178	1	15.79366	7.762	0.0082
		whattypecomponentclass{0-1}	0	1	1.788671	0.876	0.3551
		whattypecomponentOS{0-1}	0	1	0.359632	0.173	0.6798
		whattypecomponentdevelopment{0-1}	0	1	1.501858	0.733	0.3973
		whattypeenterpriseacctng{0-1}	0	1	1.13712	0.552	0.4619
	X	whattypeenterprisemanufact{0-1}	-0.6809201	1	4.29575	2.111	0.1542
	X	whattypeenterprisepayroll{0-1}	0.860886	1	10.52068	5.170	0.0286
		whattypeenterprisescripting{0-1}	0	1	1.505615	0.735	0.3967
		whatprocessdesign{0-1}	0	1	1.547712	0.756	0.3901
		whatprocesstesting{0-1}	0	1	0.103145	0.049	0.8252
		whatprocessmaintenance{0-1}	0	1	0.488836	0.236	0.6302
		whatprocessreengineering{0-1}	0	1	1.821753	0.893	0.3507
		whatprocessappsuppt{0-1}	0	1	0.055011	0.026	0.8719
		whatprocesstraining{0-1}	0	1	0.1246	0.060	0.8082
		whatprocessspecification{0-1}	0	1	0.302146	0.145	0.7053
		whatprocesscoding{0-1}	0	1	0.018649	0.009	0.9252
		whatprocessfielding{0-1}	0	1	1.595572	0.780	0.3828
		whatprocessCM{0-1}	0	1	0.02836	0.014	0.9078
		whatprocesstoolsuppt{0-1}	0	1	0.211393	0.101	0.7518
		whatprocessSWEngSuppt{0-1}	0	1	0.179373	0.086	0.7708
		whatprocessnone{0-1}	0	1	0.212452	0.102	0.7512
	X	whatproductscustom{0-1}	0.68908366	1	17.4708	8.586	0.0056
		whatproductsCOTS{0-1}	0	1	0.567121	0.274	0.6040
	X	whatproductscommoncust{0-1}	-0.4461527	1	4.87761	2.397	0.1296
		whatproductsnone{0-1}	0	1	0.098	0.047	0.8296

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypesystemscommunications{0-1}	Entered	0.0849	8.110728	0.0660	-15.87	2
2	whatproductscustom{0-1}	Entered	0.0778	8.106118	0.1319	-15.72	3
3	whattypeenterprisepayroll{0-1}	Entered	0.0658	8.361054	0.1999	-15.62	4
4	whattypecomponentCASE{0-1}	Entered	0.0462	9.19192	0.2746	-15.71	5
5	whatproductscommoncust{0-1}	Entered	0.1110	5.554858	0.3198	-14.97	6
6	whattypeenterprisemanufact{0-1}	Entered	0.1542	4.29575	0.3547	-13.95	7

Response Column 39
Actual by Predicted Plot



Summary of Fit

RSquare	0.3547
RSquare Adj	0.255423
Root Mean Square Error	1.42647
Mean of Response	2.978261
Observations (or Sum Wgts)	46

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	43.62043	7.27007	3.5728
Error	39	79.35783	2.03482	Prob > F
C. Total	45	122.97826		0.0065

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	8	19.552278	2.44403	1.2669
Pure Error	31	59.805556	1.92921	Prob > F
Total Error	39	79.357834		0.2960
				Max RSq
				0.5137

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.7027908	0.413969	8.94	<.0001
whattypesystemscommunications[1-0]	0.9399542	0.509235	1.85	0.0725
whattypecomponentCASE[1-0]	-3.329864	1.19522	-2.79	0.0082
whattypeenterprisemanufact[1-0]	1.3618402	0.93728	1.45	0.1542
whattypeenterprisepayroll[1-0]	-1.721772	0.75721	-2.27	0.0286
whatproductscustom[1-0]	-1.378167	0.470336	-2.93	0.0056
whatproductscommoncust[1-0]	0.8923054	0.576332	1.55	0.1296

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	6.932706	3.4070	0.0725
whattypecomponentCASE	1	1	15.793655	7.7617	0.0082
whattypeenterprisemanufact	1	1	4.295750	2.1111	0.1542
whattypeenterprisepayroll	1	1	10.520685	5.1703	0.0286
whatproductscustom	1	1	17.470805	8.5859	0.0056
whatproductscommoncust	1	1	4.877610	2.3971	0.1296

Cost = 3.70 + (.94)sys-comm + (-3.33)comp-case + (1.36)ent-mnft + (-1.72)ent-pay + (-1.38)prod-cust + (.89)prod-comcust

Stepwise Fit - New Survey Data - Consequences (Schedule)

Response:
Column 40

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

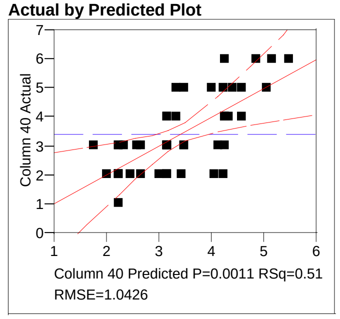
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
39.131272	36	1.0869798	0.5056	0.3820	-6.218063	12.56091

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.52914565	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	1.016683	0.934	0.3406
	X	whattypesystemsembedded{0-1}	-0.4035016	1	1.553509	1.429	0.2397
		whattypesystemscommunications{0-1}	0	1	0.176682	0.159	0.6927
	X	whattypesystemsdevice{0-1}	1.24929933	1	16.72195	15.384	0.0004
	X	whattypeshrinkbusiness{0-1}	-0.5496872	1	9.960641	9.164	0.0045
	X	whattypeshrinkutilities{0-1}	-0.5516462	1	2.622341	2.413	0.1291
		whattypeshrinkinternet{0-1}	0	1	1.283646	1.187	0.2834
		whattypecomponentdomain{0-1}	0	1	0.00319	0.003	0.9577
		whattypecomponentCASE{0-1}	0	1	0.078564	0.070	0.7923
		whattypecomponentclass{0-1}	0	1	0.013307	0.012	0.9137
		whattypecomponentOS{0-1}	0	1	0.19009	0.171	0.6819
		whattypecomponentdevelopment{0-1}	0	1	0.178055	0.160	0.6916
	X	whattypeenterpriseacctng{0-1}	0.57666194	1	4.99132	4.592	0.0390
		whattypeenterprisemanufact{0-1}	0	1	1.116452	1.028	0.3176
		whattypeenterprisepayroll{0-1}	0	1	0.812725	0.742	0.3948
	X	whattypeenterprisescripting{0-1}	0.89995918	1	5.758236	5.297	0.0273
		whatprocessrequirements{0-1}	0	1	0.651667	0.593	0.4465
		whatprocessdesign{0-1}	0	1	0.080085	0.072	0.7903
		whatprocesstesting{0-1}	0	1	0.199797	0.180	0.6743
	X	whatprocessmaintenance{0-1}	0.46394251	1	6.252855	5.753	0.0218
	X	whatprocessreengineering{0-1}	-0.4486158	1	5.455645	5.019	0.0313
		whatprocessappsuppt{0-1}	0	1	0.069306	0.062	0.8047
	X	whatprocesstraining{0-1}	-0.6298988	1	9.797314	9.013	0.0048
		whatprocessspecification{0-1}	0	1	0.008293	0.007	0.9318
		whatprocesscoding{0-1}	0	1	0.047741	0.043	0.8374
		whatprocessfielding{0-1}	0	1	0.218545	0.197	0.6602
		whatprocessCM{0-1}	0	1	0.122813	0.110	0.7419
		whatprocesstoolsuppt{0-1}	0	1	0.000385	0.000	0.9853
		whatprocessSWEngSuppt{0-1}	0	1	0.001822	0.002	0.9680
		whatprocessnone{0-1}	0	1	0.226425	0.204	0.6545
		whatproductscustom{0-1}	0	1	0.905116	0.829	0.3689
		whatproductsCOTS{0-1}	0	1	0.33404	0.301	0.5865
		whatproductscommoncust{0-1}	0	1	1.153747	1.063	0.3095
		whatproductsnone{0-1}	0	1	0.181474	0.163	0.6888

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeshrinkbusiness{0-1}	Entered	0.0650	5.959191	0.0753	-4.999	2
2	whattypesystemsdevice{0-1}	Entered	0.0173	9.126316	0.1906	-7.613	3
3	whattypesystemsembedded{0-1}	Entered	0.0788	4.595922	0.2487	-7.936	4
4	whatprocesstraining{0-1}	Entered	0.1613	2.811707	0.2842	-7.357	5
5	whattypeenterprisescripting{0-1}	Entered	0.1407	3.028336	0.3224	-6.888	6
6	whattypeenterpriseacctng{0-1}	Entered	0.0990	3.658833	0.3687	-6.738	7
7	whatprocessreengineering{0-1}	Entered	0.0846	3.810213	0.4168	-6.664	8
8	whatprocessmaintenance{0-1}	Entered	0.0556	4.408042	0.4725	-6.892	9
9	whattypeshrinkutilities{0-1}	Entered	0.1291	2.622341	0.5056	-6.218	10

Response Column 40
Actual by Predicted Plot



Summary of Fit

RSquare	0.50562
RSquare Adj	0.382025
Root Mean Square Error	1.042583
Mean of Response	3.413043
Observations (or Sum Wgts)	46

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	40.020902	4.44677	4.0909
Error	36	39.131272	1.08698	Prob > F
C. Total	45	79.152174		0.0011

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	16	19.881272	1.24258	1.2910
Pure Error	20	19.250000	0.96250	Prob > F
Total Error	36	39.131272		0.2910
				Max RSq
				0.7568

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.1356591	0.273249	11.48	<.0001
whattypesystemsembedded[1-0]	0.8070031	0.675039	1.20	0.2397
whattypesystemsdevice[1-0]	-2.498599	0.637036	-3.92	0.0004
whattypeshrinkbusiness[1-0]	1.0993744	0.363172	3.03	0.0045
whattypeshrinkutilities[1-0]	1.1032924	0.710324	1.55	0.1291
whattypeenterpriseacctng[1-0]	-1.153324	0.538213	-2.14	0.0390
whattypeenterprisescripting[1-0]	-1.799918	0.782022	-2.30	0.0273
whatprocessmaintenance[1-0]	-0.927885	0.386871	-2.40	0.0218
whatprocessreengineering[1-0]	0.8972316	0.400491	2.24	0.0313
whatprocesstraining[1-0]	1.2597976	0.419622	3.00	0.0048

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	1.553509	1.4292	0.2397
whattypesystemsdevice	1	1	16.721945	15.3839	0.0004
whattypeshrinkbusiness	1	1	9.960641	9.1636	0.0045
whattypeshrinkutilities	1	1	2.622341	2.4125	0.1291
whattypeenterpriseacctng	1	1	4.991320	4.5919	0.0390
whattypeenterprisescripting	1	1	5.758236	5.2975	0.0273
whatprocessmaintenance	1	1	6.252855	5.7525	0.0218
whatprocessreengineering	1	1	5.455645	5.0191	0.0313
whatprocesstraining	1	1	9.797314	9.0133	0.0048

Sched = 3.14 + (.81)sys-embed + (-2.50)sys-dev + (1.10)shrink-bus + (1.10)shrink-util + (-1.15)ent-acct + (-1.80)ent-script + (-.93)proc-maint + (.90)proc-reeng + (1.26)proc-train

Stepwise Fit - New Survey Data - Consequences (IntelCapital)

Response:
Column 40

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
28.008175	35	0.8002336	0.5829	0.4637	-5.192678	-0.82267

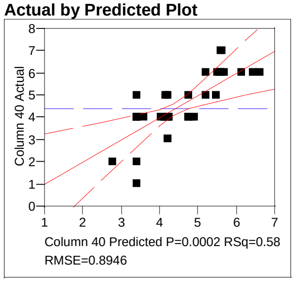
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.3776271	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.095315	0.116	0.7354
		whattypesystemsembedded{0-1}	0	1	0.923402	1.159	0.2892
		whattypesystemscommunications{0-1}	0	1	0.302138	0.371	0.5466
	X	whattypesystemsdevice{0-1}	-0.3894834	1	1.594557	1.993	0.1669
		whattypeshrinkbusiness{0-1}	0	1	0.243258	0.298	0.5888
		whattypeshrinkutilities{0-1}	0	1	0.943237	1.185	0.2840
	X	whattypeshrinkinternet{0-1}	-0.6819844	1	11.70104	14.622	0.0005
	X	whattypecomponentdomain{0-1}	-0.4996501	1	2.317897	2.897	0.0976
		whattypecomponentCASE{0-1}	0	1	0.145889	0.178	0.6757
		whattypecomponentclass{0-1}	0	1	0.157367	0.192	0.6639
	X	whattypecomponentOS{0-1}	0.72092249	1	5.029578	6.285	0.0170
		whattypecomponentdevelopment{0-1}	0	1	0.068966	0.084	0.7738
	X	whattypeenterpriseacctng{0-1}	-0.4207597	1	2.633816	3.291	0.0782
		whattypeenterprisemanufact{0-1}	0	1	0.187128	0.229	0.6356
		whattypeenterprisepayroll{0-1}	0	1	0.410308	0.505	0.4819
		whattypeenterprisescripting{0-1}	0	1	0.02766	0.034	0.8556
		whatprocessrequirements{0-1}	0	1	0.489014	0.604	0.4424
		whatprocessdesign{0-1}	0	1	0.032983	0.040	0.8425
		whatprocesstesting{0-1}	0	1	0.425346	0.524	0.4740
	X	whatprocessmaintenance{0-1}	-0.40975	1	5.070822	6.337	0.0166
		whatprocessreengineering{0-1}	0	1	0.00577	0.007	0.9338
		whatprocessappsuppt{0-1}	0	1	0.146864	0.179	0.6747
		whatprocesstraining{0-1}	0	1	0.368537	0.453	0.5053
		whatprocessspecification{0-1}	0	1	0.748333	0.933	0.3408
		whatprocesscoding{0-1}	0	1	0.133412	0.163	0.6892
	X	whatprocessfielding{0-1}	0.38457251	1	1.115911	1.394	0.2456
	X	whatprocessCM{0-1}	0.73327355	1	7.324149	9.153	0.0046
	X	whatprocesstoolsuppt{0-1}	-0.7504809	1	6.372963	7.964	0.0078
	X	whatprocessSWEngSuppt{0-1}	-0.6836766	1	8.930003	11.159	0.0020
		whatprocessnone{0-1}	0	1	0.333058	0.409	0.5267
		whatproductscustom{0-1}	0	1	0.415287	0.512	0.4793
		whatproductsCOTS{0-1}	0	1	0.067629	0.082	0.7760
		whatproductscommoncust{0-1}	0	1	0.331416	0.407	0.5277
		whatproductsnone{0-1}	0	1	0.020338	0.025	0.8760

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0059	10.71914	0.1596	-4.106	2
2	whattypeshrinkinternet{0-1}	Entered	0.0182	6.935211	0.2629	-6.763	3
3	whattypecomponentdomain{0-1}	Entered	0.0155	6.521159	0.3600	-9.141	4
4	whatprocesstraining{0-1}	Entered	0.1331	2.327595	0.3947	-8.704	5
5	whattypecomponentOS{0-1}	Entered	0.0538	3.652109	0.4491	-9.157	6
6	whatprocessCM{0-1}	Entered	0.1925	1.596481	0.4728	-8.229	7
7	whatprocesstoolsuppt{0-1}	Entered	0.1247	2.156643	0.5049	-7.677	8
8	whatprocessmaintenance{0-1}	Entered	0.2109	1.395474	0.5257	-6.614	9
9	whattypesystemsdevice{0-1}	Entered	0.1538	1.772972	0.5521	-5.805	10
10	whattypeenterpriseacctng{0-1}	Entered	0.2097	1.340845	0.5721	-4.705	11
11	whatprocesstraining{0-1}	Removed	0.4955	0.389541	0.5663	-6.443	10
12	whatprocessfielding{0-1}	Entered	0.2456	1.115911	0.5829	-5.193	11

Response Column 40

Actual by Predicted Plot



Summary of Fit

RSquare	0.582915
RSquare Adj	0.463748
Root Mean Square Error	0.894558
Mean of Response	4.413043
Observations (or Sum Wgts)	46

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	39.143999	3.91440	4.8916
Error	35	28.008175	0.80023	Prob > F
C. Total	45	67.152174		0.0002

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	17	11.496054	0.676238	0.7372
Pure Error	18	16.512121	0.917340	Prob > F
Total Error	35	28.008175		0.7330
				Max RSq
				0.7541

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.3806104	0.228154	14.82	<.0001
whattypesystemsdevice[1-0]	0.7789669	0.551833	1.41	0.1669
whattypeshrinkinternet[1-0]	1.3639689	0.356698	3.82	0.0005
whattypecomponentdomain[1-0]	0.9993003	0.587161	1.70	0.0976
whattypecomponentOS[1-0]	-1.441845	0.575124	-2.51	0.0170
whattypeenterpriseacctng[1-0]	0.8415194	0.463852	1.81	0.0782
whatprocessmaintenance[1-0]	0.8195	0.32555	2.52	0.0166
whatprocessfielding[1-0]	-0.769145	0.651331	-1.18	0.2456
whatprocessCM[1-0]	-1.466547	0.484759	-3.03	0.0046
whatprocesstoolsuppt[1-0]	1.5009619	0.531872	2.82	0.0078
whatprocessSWEngSuppt[1-0]	1.3673532	0.40932	3.34	0.0020

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsdevice	1	1	1.594557	1.9926	0.1669
whattypeshrinkinternet	1	1	11.701037	14.6220	0.0005
whattypecomponentdomain	1	1	2.317897	2.8965	0.0976
whattypecomponentOS	1	1	5.029578	6.2851	0.0170
whattypeenterpriseacctng	1	1	2.633816	3.2913	0.0782
whatprocessmaintenance	1	1	5.070822	6.3367	0.0166
whatprocessfielding	1	1	1.115911	1.3945	0.2456
whatprocessCM	1	1	7.324149	9.1525	0.0046
whatprocesstoolsuppt	1	1	6.372963	7.9639	0.0078
whatprocessSWEngSuppt	1	1	8.930003	11.1592	0.0020

IntelCap = 3.38 + (.78)sys-dev + (1.36)shrink-int + (1.00)comp-domain + (-1.44)comp-os + (.84)ent-acct + (.82)proc-maint + (-.77)proc-field + (-1.47)proc-cm + (1.50)proc-toolsup + (1.37)proc-swengsup

Stepwise Fit - New Survey Data - Consequences (SchedFlex)
Response:
Column 40

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

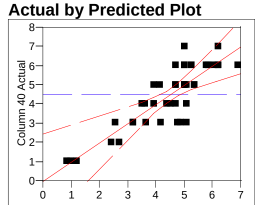
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
30.045838	32	0.9389324	0.7399	0.6342	-2.396465	8.407807

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	-0.3545249	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.774739	0.820	0.3720
	X	whattypesystemsembedded{0-1}	1.26487859	1	16.11252	17.160	0.0002
		whattypesystemscommunications{0-1}	0	1	0.14589	0.151	0.7000
		whattypesystemsdevice{0-1}	0	1	0.001872	0.002	0.9652
	X	whattypeshrinkbusiness{0-1}	0.54952738	1	11.81094	12.579	0.0012
		whattypeshrinkutilities{0-1}	0	1	0.078544	0.081	0.7775
		whattypeshrinkinternet{0-1}	0	1	0.407695	0.426	0.5186
		whattypecomponentdomain{0-1}	0	1	0.068426	0.071	0.7920
	X	whattypecomponentCASE{0-1}	2.50028057	1	23.25663	24.769	0.0000
	X	whattypecomponentclass{0-1}	1.47000467	1	15.04065	16.019	0.0003
		whattypecomponentOS{0-1}	0	1	0.492675	0.517	0.4776
	X	whattypecomponentdevelopment{0-1}	0.65905834	1	7.304894	7.780	0.0088
	X	whattypeenterpriseacctng{0-1}	-0.9622171	1	9.845101	10.485	0.0028
		whattypeenterprisemanufact{0-1}	0	1	0.347059	0.362	0.5516
	X	whattypeenterprisepayroll{0-1}	0.59615824	1	4.067231	4.332	0.0455
		whattypeenterprisescripting{0-1}	0	1	0.649942	0.685	0.4141
		whatprocessrequirements{0-1}	0	1	0.053362	0.055	0.8159
	X	whatprocessdesign{0-1}	0.62655563	1	5.195615	5.534	0.0250
	X	whatprocesstesting{0-1}	-1.0971388	1	17.88281	19.046	0.0001
		whatprocessmaintenance{0-1}	0	1	0.238712	0.248	0.6218
		whatprocessreengineering{0-1}	0	1	0.138292	0.143	0.7076
		whatprocessappsuppt{0-1}	0	1	0.009611	0.010	0.9213
		whatprocesstraining{0-1}	0	1	0.445768	0.467	0.4995
		whatprocessspecification{0-1}	0	1	0.000094	0.000	0.9922
	X	whatprocesscoding{0-1}	-0.2741587	1	1.452279	1.547	0.2227
		whatprocessfielding{0-1}	0	1	0.972452	1.037	0.3164
	X	whatprocessCM{0-1}	1.50517411	1	26.74184	28.481	0.0000
		whatprocesstoolsuppt{0-1}	0	1	0.022699	0.023	0.8793
	X	whatprocessSWEngSuppt{0-1}	-0.9210343	1	10.97408	11.688	0.0017
		whatprocessnone{0-1}	0	1	0.043465	0.045	0.8336
		whatproductscustom{0-1}	0	1	0.146213	0.152	0.6997
		whatproductsCOTS{0-1}	0	1	0.612217	0.645	0.4281
	X	whatproductscommoncust{0-1}	-0.8867386	1	14.22332	15.148	0.0005
		whatproductsnone{0-1}	0	1	0.007464	0.008	0.9306

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypesystemsembedded{0-1}	Entered	0.0137	15.06589	0.1304	10.158	2
2	whattypeshrinkbusiness{0-1}	Entered	0.0150	13.05319	0.2435	5.379	3
3	whatproductsnone{0-1}	Entered	0.0123	12.25009	0.3495	1.0173	4
4	whattypecomponentclass{0-1}	Entered	0.0917	5.093144	0.3936	0.3723	5
5	whatproductscommoncust{0-1}	Entered	0.1199	4.159325	0.4296	0.2122	6
6	whatprocessnone{0-1}	Entered	0.1981	2.773217	0.4536	0.772	7
7	whatprocesstesting{0-1}	Entered	0.1439	3.493746	0.4839	0.9577	8
8	whatprocessCM{0-1}	Entered	0.0431	6.321743	0.5386	-0.325	9
9	whatprocessrequirements{0-1}	Entered	0.1824	2.60234	0.5611	0.3232	10
10	whattypecomponentCASE{0-1}	Entered	0.1993	2.363301	0.5816	1.0958	11
11	whatprocessnone{0-1}	Removed	0.4284	0.886522	0.5739	-0.444	10
12	whatprocessSWEngSuppt{0-1}	Entered	0.1359	3.071432	0.6005	-0.039	11
13	whatproductsnone{0-1}	Removed	0.4113	0.911691	0.5926	-1.565	10
14	whattypeenterprisepayroll{0-1}	Entered	0.0511	4.913742	0.6352	-2.117	11
15	whatprocessrequirements{0-1}	Removed	0.3929	0.900881	0.6274	-3.649	10
16	whattypeenterpriseacctng{0-1}	Entered	0.1181	2.941165	0.6528	-3.177	11
17	whattypecomponentdevelopment{0-1}	Entered	0.0441	4.568681	0.6924	-3.549	12
18	whatprocessdesign{0-1}	Entered	0.0479	4.029973	0.7273	-3.642	13
19	whatprocesscoding{0-1}	Entered	0.2227	1.452279	0.7399	-2.396	14

Response Column 40
Actual by Predicted Plot



Column 40 Predicted P<.0001 RSq=0.74
RMSE=0.969

Summary of Fit

RSquare	0.739863
RSquare Adj	0.634182
Root Mean Square Error	0.968985
Mean of Response	4.5
Observations (or Sum Wgts)	46

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	13	85.45416	6.57340	7.0009
Error	32	30.04584	0.93893	Prob > F
C. Total	45	115.50000		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	19	25.379171	1.33575	3.7210
Pure Error	13	4.666667	0.35897	Prob > F
Total Error	32	30.045838		0.0096
				Max RSq
				0.9596

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.6758251	0.357505	13.08	<.0001
whattypesystemsembedded[1-0]	-2.529757	0.610681	-4.14	0.0002
whattypeshrinkbusiness[1-0]	-1.099055	0.309881	-3.55	0.0012
whattypecomponentCASE[1-0]	-5.000561	1.00476	-4.98	<.0001
whattypecomponentclass[1-0]	-2.940009	0.734569	-4.00	0.0003
whattypecomponentdevelopment[1-0]	-1.318117	0.472568	-2.79	0.0088
whattypeenterpriseacctng[1-0]	1.9244342	0.594306	3.24	0.0028
whattypeenterprisepayroll[1-0]	-1.192316	0.572874	-2.08	0.0455
whatprocessdesign[1-0]	-1.253111	0.532707	-2.35	0.0250
whatprocesstesting[1-0]	2.1942777	0.502795	4.36	0.0001
whatprocesscoding[1-0]	0.5483174	0.440884	1.24	0.2227
whatprocessCM[1-0]	-3.010348	0.564077	-5.34	<.0001
whatprocessSWEngSuppt[1-0]	1.8420686	0.538814	3.42	0.0017
whatproductscommoncust[1-0]	1.7734772	0.455661	3.89	0.0005

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	16.112522	17.1605	0.0002
whattypeshrinkbusiness	1	1	11.810936	12.5791	0.0012
whattypecomponentCASE	1	1	23.256633	24.7692	<.0001
whattypecomponentclass	1	1	15.040651	16.0189	0.0003
whattypecomponentdevelopment	1	1	7.304894	7.7800	0.0088
whattypeenterpriseacctng	1	1	9.845101	10.4854	0.0028
whattypeenterprisepayroll	1	1	4.067231	4.3318	0.0455
whatprocessdesign	1	1	5.195615	5.5335	0.0250
whatprocesstesting	1	1	17.882806	19.0459	0.0001
whatprocesscoding	1	1	1.452279	1.5467	0.2227
whatprocessCM	1	1	26.741840	28.4811	<.0001
whatprocessSWEngSuppt	1	1	10.974078	11.6878	0.0017
whatproductscommoncust	1	1	14.223322	15.1484	0.0005

SchedFlex = 4.68 + sys-embed(-2.53) + shrink-bus(-1.10) + comp-CASE(-5.00) + comp-class(-2.94) + comp-dev(-1.32) + ent-acct(1.92) + ent-pay(-1.19) + proc-des(-1.25) + proc-test(2.19) + proc-coding(0.55) + proc-CM(-3.01) + proc-SWEngSup(1.84) + prod-comcust(1.77)

Stepwise Fit - New Survey Data - Consequences (AdminOverhead)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

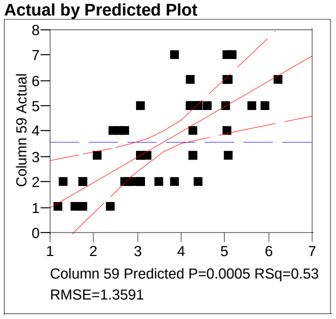
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
66.493031	36	1.8470286	0.5283	0.4103	-8.477527	36.94896

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	1.72251624	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.658375	0.350	0.5579
		whattypesystemsembedded{0-1}	0	1	0.243243	0.129	0.7221
		whattypesystemscommunications{0-1}	0	1	0.94832	0.506	0.4814
		whattypesystemsdevice{0-1}	0	1	1.277188	0.685	0.4133
		whattypeshrinkbusiness{0-1}	0	1	0.027209	0.014	0.9054
		whattypeshrinkutilities{0-1}	0	1	1.785783	0.966	0.3324
	X	whattypeshrinkinternet{0-1}	-0.3887688	1	3.906444	2.115	0.1545
		whattypecomponentdomain{0-1}	0	1	0.160176	0.085	0.7730
		whattypecomponentCASE{0-1}	0	1	1.715916	0.927	0.3422
	X	whattypecomponentclass{0-1}	1.10308015	1	11.313	6.125	0.0182
	X	whattypecomponentOS{0-1}	0.92052294	1	8.508319	4.606	0.0387
		whattypecomponentdevelopment{0-1}	0	1	0.009701	0.005	0.9434
		whattypeenterpriseacctng{0-1}	0	1	0.339783	0.180	0.6742
		whattypeenterprisemanufact{0-1}	0	1	0.124606	0.066	0.7992
		whattypeenterprisepayroll{0-1}	0	1	0.991785	0.530	0.4715
		whattypeenterprisescripting{0-1}	0	1	0.038605	0.020	0.8874
	X	whatprocessrequirements{0-1}	-0.6649058	1	10.37938	5.620	0.0232
		whatprocessdesign{0-1}	0	1	0.747069	0.398	0.5324
	X	whatprocesstesting{0-1}	0.6084427	1	11.59251	6.276	0.0169
		whatprocessmaintenance{0-1}	0	1	0.02869	0.015	0.9029
		whatprocessreengineering{0-1}	0	1	1.031179	0.551	0.4627
		whatprocessappsuppt{0-1}	0	1	0.466099	0.247	0.6223
		whatprocesstraining{0-1}	0	1	0.022942	0.012	0.9131
		whatprocessspecification{0-1}	0	1	0.379908	0.201	0.6566
		whatprocesscoding{0-1}	0	1	0.985615	0.527	0.4729
		whatprocessfielding{0-1}	0	1	0.78763	0.420	0.5214
		whatprocessCM{0-1}	0	1	0.313446	0.166	0.6864
	X	whatprocesstoolsuppt{0-1}	-0.7607488	1	10.2072	5.526	0.0243
	X	whatprocessSWEngSuppt{0-1}	0.8481211	1	15.13001	8.192	0.0070
		whatprocessnone{0-1}	0	1	0.178195	0.094	0.7609
		whatproductscustom{0-1}	0	1	0.680208	0.362	0.5514
		whatproductsCOTS{0-1}	0	1	0.001691	0.001	0.9764
	X	whatproductscommoncust{0-1}	-0.3922808	1	3.025995	1.638	0.2087
	X	whatproductsnone{0-1}	1.2731605	1	23.11573	12.515	0.0011

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsnone{0-1}	Entered	0.0058	22.63457	0.1606	-10.82	2
2	whattypecomponentclass{0-1}	Entered	0.0405	11.12195	0.2395	-11.75	3
3	whattypecomponentOS{0-1}	Entered	0.1290	5.790476	0.2806	-11.28	4
4	whatprocesstesting{0-1}	Entered	0.1492	5.077765	0.3166	-10.61	5
5	whatprocessrequirements{0-1}	Entered	0.0503	8.90479	0.3798	-10.96	6
6	whatprocessSWEngSuppt{0-1}	Entered	0.1232	5.230746	0.4169	-10.34	7
7	whatprocesstoolsuppt{0-1}	Entered	0.0382	8.891698	0.4799	-10.68	8
8	whattypeshrinkinternet{0-1}	Entered	0.1641	3.785499	0.5068	-9.68	9
9	whatproductscommoncust{0-1}	Entered	0.2087	3.025995	0.5283	-8.478	10

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.528273
RSquare Adj	0.410341
Root Mean Square Error	1.359054
Mean of Response	3.608696
Observations (or Sum Wgts)	46

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	74.46349	8.27372	4.4795
Error	36	66.49303	1.84703	Prob > F
C. Total	45	140.95652		0.0005

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	17	39.147793	2.30281	1.6000
Pure Error	19	27.345238	1.43922	Prob > F
Total Error	36	66.493031		0.1610
				Max RSq
				0.8060

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.2691395	0.425788	10.03	<.0001
whattypeshrinkinternet[1-0]	0.7775376	0.534647	1.45	0.1545
whattypecomponentclass[1-0]	-2.20616	0.891425	-2.47	0.0182
whattypecomponentOS[1-0]	-1.841046	0.857787	-2.15	0.0387
whatprocessrequirements[1-0]	1.3298116	0.560972	2.37	0.0232
whatprocesstesting[1-0]	-1.216885	0.485733	-2.51	0.0169
whatprocesstoolsuppt[1-0]	1.5214975	0.647224	2.35	0.0243
whatprocessSWEngSuppt[1-0]	-1.696242	0.592659	-2.86	0.0070
whatproductscommoncust[1-0]	0.7845615	0.612957	1.28	0.2087
whatproductsnone[1-0]	-2.546321	0.719774	-3.54	0.0011

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkinternet	1	1	3.906444	2.1150	0.1545
whattypecomponentclass	1	1	11.312998	6.1250	0.0182
whattypecomponentOS	1	1	8.508319	4.6065	0.0387
whatprocessrequirements	1	1	10.379384	5.6195	0.0232
whatprocesstesting	1	1	11.592515	6.2763	0.0169
whatprocesstoolsuppt	1	1	10.207198	5.5263	0.0243
whatprocessSWEngSuppt	1	1	15.130015	8.1915	0.0070
whatproductscommoncust	1	1	3.025995	1.6383	0.2087
whatproductsnone	1	1	23.115732	12.5151	0.0011

AdminOverhead = 4.27 + shrink-int(0.78) + comp-class(-2.21) + comp-OS(-1.84) + proc-req(1.33) + proc-test(-1.22) + proc-toolsup(1.52) + proc-SWEngSup(-1.70) + prod-comcust(0.78) + prod-none(-2.55)

Stepwise Fit - New Survey Data - Consequences (ControlProcess)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

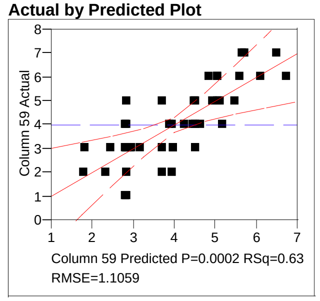
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
40.357179	33	1.2229448	0.6331	0.4997	-0.041754	19.97988

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.62803471	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-1.0541902	1	7.475665	6.113	0.0187
		whattypesystemsembedded{0-1}	0	1	0.006575	0.005	0.9429
		whattypesystemscommunications{0-1}	0	1	0.982319	0.798	0.3783
	X	whattypesystemsdevice{0-1}	-0.8931264	1	9.175545	7.503	0.0099
		whattypeshrinkbusiness{0-1}	0	1	0.612079	0.493	0.4878
	X	whattypeshrinkutilities{0-1}	0.74174585	1	4.888518	3.997	0.0539
		whattypeshrinkinternet{0-1}	0	1	0.951513	0.773	0.3859
		whattypecomponentdomain{0-1}	0	1	0.002036	0.002	0.9682
		whattypecomponentCASE{0-1}	0	1	0.04261	0.034	0.8552
		whattypecomponentclass{0-1}	0	1	0.345931	0.277	0.6025
	X	whattypecomponentOS{0-1}	0.74050624	1	4.419838	3.614	0.0661
	X	whattypecomponentdevelopment{0-1}	-0.8331768	1	16.06059	13.133	0.0010
		whattypeenterpriseacctng{0-1}	0	1	0.54165	0.435	0.5141
	X	whattypeenterprisemanufact{0-1}	0.50193772	1	2.415963	1.976	0.1692
	X	whattypeenterprisepayroll{0-1}	0.51834656	1	3.146373	2.573	0.1182
		whattypeenterprisescripting{0-1}	0	1	0.125498	0.100	0.7541
		whatprocessrequirements{0-1}	0	1	0.116795	0.093	0.7625
		whatprocessdesign{0-1}	0	1	0.542842	0.436	0.5136
		whatprocesstesting{0-1}	0	1	0.12514	0.100	0.7544
		whatprocessmaintenance{0-1}	0	1	0.199997	0.159	0.6924
		whatprocessreengineering{0-1}	0	1	0.149328	0.119	0.7325
	X	whatprocessappsuppt{0-1}	-0.5635149	1	9.294997	7.601	0.0094
		whatprocesstraining{0-1}	0	1	0.176959	0.141	0.7098
		whatprocessspecification{0-1}	0	1	0.515109	0.414	0.5247
	X	whatprocesscoding{0-1}	0.57219524	1	7.618211	6.229	0.0177
		whatprocessfielding{0-1}	0	1	0.331069	0.265	0.6105
		whatprocessCM{0-1}	0	1	0.008992	0.007	0.9332
		whatprocesstoolsuppt{0-1}	0	1	0.119657	0.095	0.7597
	X	whatprocessSWEngSuppt{0-1}	-0.5495356	1	7.75271	6.339	0.0168
		whatprocessnone{0-1}	0	1	0.371568	0.297	0.5893
		whatproductscustom{0-1}	0	1	1.425588	1.172	0.2871
	X	whatproductsCOTS{0-1}	-0.4300807	1	3.895401	3.185	0.0835
		whatproductscommoncust{0-1}	0	1	0.000772	0.001	0.9804
	X	whatproductsnone{0-1}	0.58467308	1	4.759368	3.892	0.0570

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeenterpriseacctng{0-1}	Entered	0.0136	14.36098	0.1306	5.2973	2
2	whattypesystemsdevice{0-1}	Entered	0.0880	6.330916	0.1881	4.1664	3
3	whattypesystemsavionics{0-1}	Entered	0.0649	7.03668	0.2521	2.6865	4
4	whatprocessappsuppt{0-1}	Entered	0.0341	8.631018	0.3305	0.4181	5
5	whattypecomponentdevelopment{0-1}	Entered	0.0120	10.86669	0.4293	-2.956	6
6	whatproductsnone{0-1}	Entered	0.1698	2.997959	0.4566	-2.438	7
7	whattypeenterprisemanufact{0-1}	Entered	0.1353	3.451219	0.4880	-2.145	8
8	whattypeenterpriseacctng{0-1}	Removed	0.2866	1.731321	0.4722	-3.289	7
9	whatprocessdesign{0-1}	Entered	0.1225	3.577699	0.5047	-3.058	8
10	whattypeenterprisepayroll{0-1}	Entered	0.1335	3.257695	0.5344	-2.669	9
11	whatprocessSWEngSuppt{0-1}	Entered	0.1407	3.036362	0.5620	-2.171	10
12	whattypeshrinkutilities{0-1}	Entered	0.2302	1.968589	0.5799	-1.145	11
13	whatprocesscoding{0-1}	Entered	0.2378	1.88283	0.5970	-0.076	12
14	whattypecomponentOS{0-1}	Entered	0.1842	2.341313	0.6183	0.7664	13
15	whatproductsCOTS{0-1}	Entered	0.1953	2.177043	0.6381	1.6898	14
16	whatprocessdesign{0-1}	Removed	0.5136	0.542842	0.6331	-0.042	13

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.633117
RSquare Adj	0.499704
Root Mean Square Error	1.105868
Mean of Response	4
Observations (or Sum Wgts)	46

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	12	69.64282	5.80357	4.7456
Error	33	40.35718	1.22294	Prob > F
C. Total	45	110.00000		0.0002

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	19	16.523845	0.86968	0.5109
Pure Error	14	23.833333	1.70238	Prob > F
Total Error	33	40.357179		0.9136
				Max RSq
				0.7833

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.9638148	0.482208	8.22	<.0001
whattypesystemsavionics[1-0]	2.1083804	0.852761	2.47	0.0187
whattypesystemsdevice[1-0]	1.7862529	0.652124	2.74	0.0099
whattypeshrinkutilities[1-0]	-1.483492	0.741993	-2.00	0.0539
whattypecomponentOS[1-0]	-1.481012	0.779039	-1.90	0.0661
whattypecomponentdevelopment[1-0]	1.6663535	0.459822	3.62	0.0010
whattypeenterprisemanufact[1-0]	-1.003875	0.71423	-1.41	0.1692
whattypeenterprisepayroll[1-0]	-1.036693	0.646321	-1.60	0.1182
whatprocessappsuppt[1-0]	1.1270298	0.408803	2.76	0.0094
whatprocesscoding[1-0]	-1.14439	0.458512	-2.50	0.0177
whatprocessSWEngSuppt[1-0]	1.0990712	0.436518	2.52	0.0168
whatproductsCOTS[1-0]	0.8601614	0.481956	1.78	0.0835
whatproductsnone[1-0]	-1.169346	0.59275	-1.97	0.0570

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	7.475665	6.1128	0.0187
whattypesystemsdevice	1	1	9.175545	7.5028	0.0099
whattypeshrinkutilities	1	1	4.888518	3.9973	0.0539
whattypecomponentOS	1	1	4.419838	3.6141	0.0661
whattypecomponentdevelopment	1	1	16.060592	13.1327	0.0010
whattypeenterprisemanufact	1	1	2.415963	1.9755	0.1692
whattypeenterprisepayroll	1	1	3.146373	2.5728	0.1182
whatprocessappsuppt	1	1	9.294997	7.6005	0.0094
whatprocesscoding	1	1	7.618211	6.2294	0.0177
whatprocessSWEngSuppt	1	1	7.752710	6.3394	0.0168
whatproductsCOTS	1	1	3.895401	3.1853	0.0835
whatproductsnone	1	1	4.759368	3.8917	0.0570

ControlProcess = 3.96 + sys-avia(2.11) + sys-dev(1.79) + shrink-util(-1.48) + comp-OS(-1.48) + comp-dev(1.67) + ent-mnft(-1.00) + ent-pay(-1.04) + proc-appsup(1.13) + proc-coding(-1.14) + proc-SWEngSup(1.10) + prod-COTS(0.86) + prod-none(-1.17)

Stepwise Fit - New Survey Data - Consequences (InhouseNonCore)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

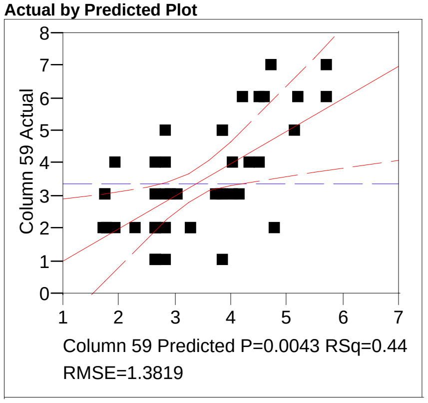
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
68.748275	36	1.9096743	0.4379	0.3130	-9.489059	37.07051

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	3.67722738	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.21318	0.109	0.7434
		whattypesystemsembedded{0-1}	0	1	2.378225	1.254	0.2704
	X	whattypesystemscommunications{0-1}	0.45975878	1	6.309406	3.304	0.0774
		whattypesystemsdevice{0-1}	0	1	0.000025	0.000	0.9972
		whattypeshrinkbusiness{0-1}	0	1	1.800434	0.941	0.3386
		whattypeshrinkutilities{0-1}	0	1	0.273127	0.140	0.7109
		whattypeshrinkinternet{0-1}	0	1	2.56645	1.357	0.2519
		whattypecomponentdomain{0-1}	0	1	2.168816	1.140	0.2929
		whattypecomponentCASE{0-1}	0	1	0.103161	0.053	0.8199
		whattypecomponentclass{0-1}	0	1	0.938755	0.485	0.4910
	X	whattypecomponentOS{0-1}	-0.7376424	1	5.829117	3.052	0.0891
	X	whattypecomponentdevelopment{0-1}	-0.9305903	1	17.64985	9.242	0.0044
		whattypeenterpriseacctng{0-1}	0	1	0.012153	0.006	0.9377
		whattypeenterprisemanufact{0-1}	0	1	1.507536	0.785	0.3818
		whattypeenterprisepayroll{0-1}	0	1	0.302058	0.154	0.6967
	X	whattypeenterprisescripting{0-1}	0.95375526	1	5.802359	3.038	0.0899
	X	whatprocessrequirements{0-1}	0.49754348	1	6.086739	3.187	0.0826
	X	whatprocessdesign{0-1}	-1.0324573	1	17.46322	9.145	0.0046
	X	whatprocesstesting{0-1}	0.44558849	1	3.612591	1.892	0.1775
		whatprocessmaintenance{0-1}	0	1	0.079447	0.040	0.8417
	X	whatprocessreengineering{0-1}	-0.6845377	1	12.31559	6.449	0.0156
		whatprocessappsuppt{0-1}	0	1	1.654793	0.863	0.3592
		whatprocesstraining{0-1}	0	1	0.090482	0.046	0.8312
		whatprocessspecification{0-1}	0	1	0.606468	0.312	0.5803
		whatprocesscoding{0-1}	0	1	0.503721	0.258	0.6145
		whatprocessfielding{0-1}	0	1	0.064179	0.033	0.8575
		whatprocessCM{0-1}	0	1	0.002951	0.002	0.9693
		whatprocesstoolsuppt{0-1}	0	1	0.304139	0.156	0.6957
		whatprocessSWEngSuppt{0-1}	0	1	0.378606	0.194	0.6625
		whatprocessnone{0-1}	0	1	0.984983	0.509	0.4804
		whatproductscustom{0-1}	0	1	0.013459	0.007	0.9345
		whatproductsCOTS{0-1}	0	1	1.08586	0.562	0.4586
		whatproductscommoncust{0-1}	0	1	0.708652	0.365	0.5499
		whatproductsnone{0-1}	0	1	2.123857	1.116	0.2981

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentdevelopment{0-1}	Entered	0.0341	12.25472	0.1002	-12.97	2
2	whattypeenterprisescripting{0-1}	Entered	0.0872	7.489656	0.1614	-12.88	3
3	whatprocessreengineering{0-1}	Entered	0.0798	7.482582	0.2226	-12.78	4
4	whatprocessdesign{0-1}	Entered	0.1528	4.793857	0.2618	-12	5
5	whatprocessrequirements{0-1}	Entered	0.0817	6.833933	0.3177	-11.74	6
6	whattypecomponentOS{0-1}	Entered	0.1170	5.292407	0.3609	-11.09	7
7	whattypesystemscommunications{0-1}	Entered	0.0933	5.80309	0.4084	-10.57	8
8	whatprocesstesting{0-1}	Entered	0.1775	3.612591	0.4379	-9.489	9

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.437923
RSquare Adj	0.313017
Root Mean Square Error	1.38191
Mean of Response	3.355556
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	53.56284	6.69535	3.5060
Error	36	68.74827	1.90967	Prob > F
C. Total	44	122.31111		0.0043

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	15	35.057798	2.33719	1.4568
Pure Error	21	33.690476	1.60431	Prob > F
Total Error	36	68.748275		0.2094
				Max RSq
				0.7246

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.6486457	0.372972	7.10	<.0001
whattypesystemscommunications[1-0]	-0.919518	0.505878	-1.82	0.0774
whattypecomponentOS[1-0]	1.4752848	0.844411	1.75	0.0891
whattypecomponentdevelopment[1-0]	1.8611806	0.612206	3.04	0.0044
whattypeenterprisescripting[1-0]	-1.907511	1.09432	-1.74	0.0899
whatprocessrequirements[1-0]	-0.995087	0.557376	-1.79	0.0826
whatprocessdesign[1-0]	2.0649145	0.682841	3.02	0.0046
whatprocesstesting[1-0]	-0.891177	0.647939	-1.38	0.1775
whatprocessreengineering[1-0]	1.3690755	0.539113	2.54	0.0156

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	6.309406	3.3039	0.0774
whattypecomponentOS	1	1	5.829117	3.0524	0.0891
whattypecomponentdevelopment	1	1	17.649854	9.2423	0.0044
whattypeenterprisescripting	1	1	5.802359	3.0384	0.0899
whatprocessrequirements	1	1	6.086739	3.1873	0.0826
whatprocessdesign	1	1	17.463218	9.1446	0.0046
whatprocesstesting	1	1	3.612591	1.8917	0.1775
whatprocessreengineering	1	1	12.315587	6.4491	0.0156

InhouseNonCore = 2.65 + sys-comm(-0.92) + comp-OS(1.48) + comp-dev(1.86) + ent-script(-1.91) + proc-req(-1.00) + proc-des(2.06) + proc-test(-0.89) + proc-reeng(1.37)

Stepwise Fit - New Survey Data - Consequences (InhouseTurnover)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
57.912676	34	1.703314	0.5111	0.3961	-10.1893	30.80266

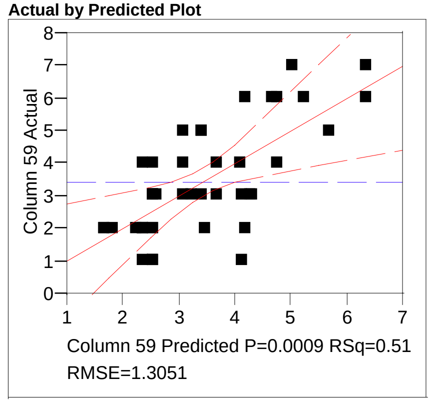
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.13724751	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.000166	0.000	0.9923
		whattypesystemsembedded{0-1}	0	1	1.543722	0.904	0.3487
		whattypesystemscommunications{0-1}	0	1	1.454364	0.850	0.3632
		whattypesystemsdevice{0-1}	0	1	0.459877	0.264	0.6107
		whattypeshrinkbusiness{0-1}	0	1	0.394162	0.226	0.6375
		whattypeshrinkutilities{0-1}	0	1	0.05437	0.031	0.8613
		whattypeshrinkinternet{0-1}	0	1	0.405376	0.233	0.6328
		whattypecomponentdomain{0-1}	0	1	0.000589	0.000	0.9855
		whattypecomponentCASE{0-1}	0	1	0.019528	0.011	0.9166
		whattypecomponentclass{0-1}	0	1	0.869941	0.503	0.4830
	X	whattypecomponentOS{0-1}	-0.8695159	1	7.386944	4.337	0.0449
	X	whattypecomponentdevelopment{0-1}	-1.1051889	1	22.17177	13.017	0.0010
		whattypeenterpriseacctng{0-1}	0	1	0.193319	0.111	0.7416
		whattypeenterprisemanufact{0-1}	0	1	1.009041	0.585	0.4497
		whattypeenterprisepayroll{0-1}	0	1	1.184276	0.689	0.4125
	X	whattypeenterprisescripting{0-1}	0.82642342	1	4.283826	2.515	0.1220
	X	whatprocessrequirements{0-1}	0.52842467	1	6.477252	3.803	0.0595
	X	whatprocessdesign{0-1}	-1.2358544	1	20.95883	12.305	0.0013
	X	whatprocesstesting{0-1}	0.44130819	1	3.48425	2.046	0.1618
		whatprocessmaintenance{0-1}	0	1	0.21965	0.126	0.7253
	X	whatprocessreengineering{0-1}	-0.5557235	1	8.417279	4.942	0.0330
		whatprocessappsuppt{0-1}	0	1	1.015946	0.589	0.4482
		whatprocesstraining{0-1}	0	1	0.020602	0.012	0.9144
	X	whatprocessspecification{0-1}	0.36214878	1	3.103879	1.822	0.1860
		whatprocesscoding{0-1}	0	1	0.839887	0.486	0.4908
		whatprocessfielding{0-1}	0	1	0.001083	0.001	0.9803
		whatprocessCM{0-1}	0	1	0.045667	0.026	0.8728
		whatprocesstoolsuppt{0-1}	0	1	0.715542	0.413	0.5250
		whatprocessSWEngSuppt{0-1}	0	1	0.305319	0.175	0.6785
		whatprocessnone{0-1}	0	1	0.662922	0.382	0.5407
		whatproductscustom{0-1}	0	1	0.014433	0.008	0.9283
		whatproductsCOTS{0-1}	0	1	2.256711	1.338	0.2557
		whatproductscommoncust{0-1}	0	1	0.012959	0.007	0.9320
		whatproductsnone{0-1}	0	1	0.724134	0.418	0.5225

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentdevelopment{0-1}	Entered	0.0111	17.43809	0.1472	-13.16	2
2	whattypeenterprisescripting{0-1}	Entered	0.0471	9.590618	0.2282	-13.62	3
3	whatprocessdesign{0-1}	Entered	0.0925	6.479512	0.2829	-13.27	4
4	whatprocessreengineering{0-1}	Entered	0.0937	6.132822	0.3346	-12.84	5
5	whatprocessrequirements{0-1}	Entered	0.0302	9.513617	0.4149	-13.27	6
6	whattypecomponentOS{0-1}	Entered	0.0857	5.532208	0.4616	-12.69	7
7	whatprocesstesting{0-1}	Entered	0.2165	2.761694	0.4849	-11.4	8
8	whatprocessspecification{0-1}	Entered	0.1860	3.103879	0.5111	-10.19	9

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.511142
RSquare Adj	0.396116
Root Mean Square Error	1.305111
Mean of Response	3.418605
Observations (or Sum Wgts)	43

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	60.55244	7.56906	4.4437
Error	34	57.91268	1.70331	Prob > F
C. Total	42	118.46512		0.0009

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	13	27.571009	2.12085	1.4679
Pure Error	21	30.341667	1.44484	Prob > F
Total Error	34	57.912676		0.2101
				Max RSq
				0.7439

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.5292699	0.363179	6.96	<.0001
whattypecomponentOS[1-0]	1.7390318	0.835069	2.08	0.0449
whattypecomponentdevelopment[1-0]	2.2103778	0.612652	3.61	0.0010
whattypeenterprisescripting[1-0]	-1.652847	1.042231	-1.59	0.1220
whatprocessrequirements[1-0]	-1.056849	0.541957	-1.95	0.0595
whatprocessdesign[1-0]	2.4717088	0.70463	3.51	0.0013
whatprocesstesting[1-0]	-0.882616	0.617113	-1.43	0.1618
whatprocessreengineering[1-0]	1.1114471	0.499977	2.22	0.0330
whatprocessspecification[1-0]	-0.724298	0.536552	-1.35	0.1860

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypecomponentOS	1	1	7.386944	4.3368	0.0449
whattypecomponentdevelopment	1	1	22.171768	13.0168	0.0010
whattypeenterprisescripting	1	1	4.283826	2.5150	0.1220
whatprocessrequirements	1	1	6.477252	3.8027	0.0595
whatprocessdesign	1	1	20.958829	12.3047	0.0013
whatprocesstesting	1	1	3.484250	2.0456	0.1618
whatprocessreengineering	1	1	8.417279	4.9417	0.0330
whatprocessspecification	1	1	3.103879	1.8223	0.1860

InhouseTurnover = 2.53 + comp-OS(1.74) + comp-dev(2.21) + ent-script(-1.65) + proc-req(-1.06) + proc-des(2.47) + proc-test(-0.88) + proc-reeng(1.11) + proc-spec(-0.72)

Stepwise Fit - New Survey Data - Consequences (LearningCurve)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

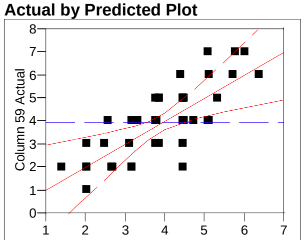
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
41.438313	34	1.2187739	0.5889	0.4680	-7.750854	18.28945

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	1.23539973	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.000299	0.000	0.9878
		whattypesystemsembedded{0-1}	0	1	0.259381	0.208	0.6514
		whattypesystemscommunications{0-1}	0	1	1.366663	1.125	0.2964
		whattypesystemsdevice{0-1}	0	1	0.452377	0.364	0.5503
		whattypeshrinkbusiness{0-1}	0	1	0.016396	0.013	0.9097
	X	whattypeshrinkutilities{0-1}	-0.7719827	1	6.343735	5.205	0.0289
		whattypeshrinkinternet{0-1}	0	1	0.579157	0.468	0.4988
		whattypecomponentdomain{0-1}	0	1	1.362002	1.122	0.2973
	X	whattypecomponentCASE{0-1}	1.86132029	1	21.98134	18.036	0.0002
	X	whattypecomponentclass{0-1}	0.94998532	1	7.770041	6.375	0.0164
		whattypecomponentOS{0-1}	0	1	0.732961	0.594	0.4463
		whattypecomponentdevelopment{0-1}	0	1	0.004251	0.003	0.9540
		whattypeenterpriseacctng{0-1}	0	1	0.428255	0.345	0.5612
		whattypeenterprisemanufact{0-1}	0	1	0.086193	0.069	0.7947
	X	whattypeenterprisepayroll{0-1}	0.56870351	1	3.55341	2.916	0.0968
		whattypeenterprisescripting{0-1}	0	1	0.026351	0.021	0.8857
		whatprocessrequirements{0-1}	0	1	0.180064	0.144	0.7067
		whatprocessdesign{0-1}	0	1	0.727565	0.590	0.4480
		whatprocesstesting{0-1}	0	1	0.690856	0.560	0.4598
		whatprocessmaintenance{0-1}	0	1	0.151973	0.121	0.7297
		whatprocessreengineering{0-1}	0	1	0.535668	0.432	0.5155
	X	whatprocessappsuppt{0-1}	-0.3219125	1	3.020342	2.478	0.1247
	X	whatprocesstraining{0-1}	0.34924856	1	3.485787	2.860	0.1000
		whatprocessspecification{0-1}	0	1	0.559616	0.452	0.5062
	X	whatprocesscoding{0-1}	-0.6474073	1	8.693202	7.133	0.0115
		whatprocessfielding{0-1}	0	1	0.654328	0.529	0.4720
	X	whatprocessCM{0-1}	0.30777557	1	2.27584	1.867	0.1808
		whatprocesstoolsuppt{0-1}	0	1	0.303821	0.244	0.6248
		whatprocessSWEngSuppt{0-1}	0	1	1.156005	0.947	0.3376
	X	whatprocessnone{0-1}	0.57478303	1	1.953073	1.602	0.2142
		whatproductscustom{0-1}	0	1	1.291256	1.061	0.3104
		whatproductsCOTS{0-1}	0	1	1.045496	0.854	0.3621
	X	whatproductscommoncust{0-1}	-0.9563475	1	17.95584	14.733	0.0005
		whatproductsnone{0-1}	0	1	0.734908	0.596	0.4457

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsnone{0-1}	Entered	0.0351	10	0.0992	-7.586	2
2	whattypecomponentOS{0-1}	Entered	0.0268	10.12252	0.1996	-9.311	3
3	whattypecomponentclass{0-1}	Entered	0.1058	5.046105	0.2497	-9.168	4
4	whattypecomponentCASE{0-1}	Entered	0.1029	4.924839	0.2985	-8.98	5
5	whatproductscommoncust{0-1}	Entered	0.0378	7.49027	0.3729	-9.737	6
6	whatprocesscoding{0-1}	Entered	0.0351	7.060514	0.4429	-10.33	7
7	whatproductsnone{0-1}	Removed	0.4083	1.032976	0.4327	-11.95	6
8	whattypeshrinkutilities{0-1}	Entered	0.0305	6.711225	0.4992	-12.42	7
9	whatprocessnone{0-1}	Entered	0.2038	2.184358	0.5209	-11.23	8
10	whattypeenterprisepayroll{0-1}	Entered	0.2406	1.83699	0.5391	-9.904	9
11	whatprocesstraining{0-1}	Entered	0.2133	2.039165	0.5594	-8.655	10
12	whattypecomponentOS{0-1}	Removed	0.3283	1.24708	0.5470	-10.2	9
13	whatprocessappsuppt{0-1}	Entered	0.2198	1.949916	0.5663	-8.913	10
14	whatprocessCM{0-1}	Entered	0.1808	2.27584	0.5889	-7.751	11

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0002 RSq=0.59
RMSE=1.104

Summary of Fit

RSquare	0.588906
RSquare Adj	0.467996
Root Mean Square Error	1.103981
Mean of Response	3.933333
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	59.36169	5.93617	4.8706
Error	34	41.43831	1.21877	Prob > F
C. Total	44	100.80000		0.0002

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	16	18.882758	1.18017	0.9418
Pure Error	18	22.555556	1.25309	Prob > F
Total Error	34	41.438313		0.5445
				Max RSq
				0.7762

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.1495661	0.46397	6.79	<.0001
whattypeshrinkutilities[1-0]	1.5439654	0.676747	2.28	0.0289
whattypecomponentCASE[1-0]	-3.722641	0.876568	-4.25	0.0002
whattypecomponentclass[1-0]	-1.899971	0.752483	-2.52	0.0164
whattypeenterprisepayroll[1-0]	-1.137407	0.666124	-1.71	0.0968
whatprocessappsuppt[1-0]	0.6438249	0.408979	1.57	0.1247
whatprocesstraining[1-0]	-0.698497	0.413024	-1.69	0.1000
whatprocesscoding[1-0]	1.2948145	0.484819	2.67	0.0115
whatprocessCM[1-0]	-0.615551	0.450459	-1.37	0.1808
whatprocessnone[1-0]	-1.149566	0.908105	-1.27	0.2142
whatproductscommoncust[1-0]	1.9126951	0.498316	3.84	0.0005

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkutilities	1	1	6.343735	5.2050	0.0289
whattypecomponentCASE	1	1	21.981339	18.0356	0.0002
whattypecomponentclass	1	1	7.770041	6.3753	0.0164
whattypeenterprisepayroll	1	1	3.553410	2.9156	0.0968
whatprocessappsuppt	1	1	3.020342	2.4782	0.1247
whatprocesstraining	1	1	3.485787	2.8601	0.1000
whatprocesscoding	1	1	8.693202	7.1327	0.0115
whatprocessCM	1	1	2.275840	1.8673	0.1808
whatprocessnone	1	1	1.953073	1.6025	0.2142
whatproductscommoncust	1	1	17.955837	14.7327	0.0005

LearningCurve = 3.15 + shrink-util(1.54) + comp-CASE(-3.72) + comp-class(-1.90) + ent-pay(-1.14) + proc-appsup(0.64) + proc-train(-0.70) + proc-coding(1.29) + proc-CM(-0.62) + proc-none(-1.15) + prod-comcust(1.91)

Stepwise Fit - New Survey Data - Consequences (Risk)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

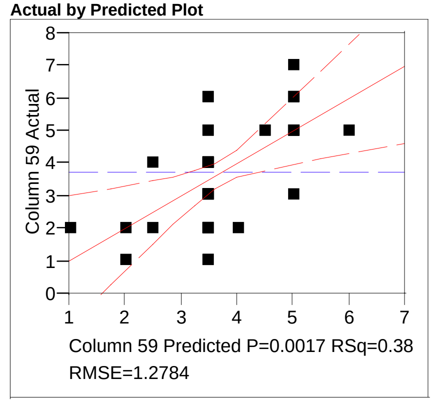
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
63.741188	39	1.6343894	0.3799	0.3005	-17.17227	27.66758

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.26591333	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.000668	0.000	0.9842
	X	whattypesystemsembedded{0-1}	-0.506609	1	2.600154	1.591	0.2147
		whattypesystemscommunications{0-1}	0	1	0.023497	0.014	0.9064
		whattypesystemsdevice{0-1}	0	1	0.00048	0.000	0.9866
		whattypeshrinkbusiness{0-1}	0	1	0.010745	0.006	0.9366
	X	whattypeshrinkutilities{0-1}	-0.756609	1	5.799576	3.548	0.0671
		whattypeshrinkinternet{0-1}	0	1	0.400015	0.240	0.6270
		whattypecomponentdomain{0-1}	0	1	0.112491	0.067	0.7969
		whattypecomponentCASE{0-1}	0	1	1.198648	0.728	0.3988
		whattypecomponentclass{0-1}	0	1	0.952848	0.577	0.4523
	X	whattypecomponentOS{0-1}	0.74284678	1	5.689865	3.481	0.0696
		whattypecomponentdevelopment{0-1}	0	1	0.205341	0.123	0.7279
		whattypeenterpriseacctng{0-1}	0	1	1.843708	1.132	0.2941
		whattypeenterprisemanufact{0-1}	0	1	0.169408	0.101	0.7521
	X	whattypeenterprisepayroll{0-1}	0.49502384	1	3.338614	2.043	0.1609
		whattypeenterprisescripting{0-1}	0	1	2.07651	1.280	0.2651
		whatprocessrequirements{0-1}	0	1	0.04932	0.029	0.8647
		whatprocessdesign{0-1}	0	1	0.064219	0.038	0.8458
		whatprocesstesting{0-1}	0	1	0.04498	0.027	0.8707
		whatprocessmaintenance{0-1}	0	1	0.008015	0.005	0.9452
		whatprocessreengineering{0-1}	0	1	1.359713	0.828	0.3685
		whatprocessappsuppt{0-1}	0	1	0.383683	0.230	0.6342
		whatprocesstraining{0-1}	0	1	0.01775	0.011	0.9186
		whatprocessspecification{0-1}	0	1	0.013787	0.008	0.9282
		whatprocesscoding{0-1}	0	1	0.1595	0.095	0.7592
		whatprocessfielding{0-1}	0	1	0.086778	0.052	0.8212
		whatprocessCM{0-1}	0	1	0.335666	0.201	0.6563
		whatprocesstoolsuppt{0-1}	0	1	0.024257	0.014	0.9049
		whatprocessSWEngSuppt{0-1}	0	1	0.282038	0.169	0.6834
		whatprocessnone{0-1}	0	1	2.07651	1.280	0.2651
		whatproductscustom{0-1}	0	1	0.491787	0.295	0.5899
		whatproductsCOTS{0-1}	0	1	1.618142	0.990	0.3261
	X	whatproductscommoncust{0-1}	-0.7581899	1	14.38397	8.801	0.0051
		whatproductsnone{0-1}	0	1	1.457479	0.889	0.3516

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentOS{0-1}	Entered	0.0136	13.72857	0.1335	-18.88	2
2	whatproductscommoncust{0-1}	Entered	0.0281	9.765056	0.2285	-19.31	3
3	whattypeshrinkutilities{0-1}	Entered	0.0241	9.356104	0.3195	-19.63	4
4	whattypeenterprisepayroll{0-1}	Entered	0.1480	3.608927	0.3547	-18.53	5
5	whattypesystemsembedded{0-1}	Entered	0.2147	2.600154	0.3799	-17.17	6

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.37995
RSquare Adj	0.300456
Root Mean Square Error	1.278432
Mean of Response	3.733333
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	39.05881	7.81176	4.7796
Error	39	63.74119	1.63439	Prob > F
C. Total	44	102.80000		0.0017

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	3	8.794098	2.93137	1.9206
Pure Error	36	54.947090	1.52631	Prob > F
Total Error	39	63.741188		0.1437
				Max RSq
				0.4655

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.4823761	0.240018	14.51	<.0001
whattypesystemsembedded[1-0]	1.0132179	0.803306	1.26	0.2147
whattypeshrinkutilities[1-0]	1.5132179	0.803306	1.88	0.0671
whattypecomponentOS[1-0]	-1.485694	0.796262	-1.87	0.0696
whattypeenterprisepayroll[1-0]	-0.990048	0.692709	-1.43	0.1609
whatproductscommoncust[1-0]	1.5163798	0.511148	2.97	0.0051

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	2.600154	1.5909	0.2147
whattypeshrinkutilities	1	1	5.799576	3.5485	0.0671
whattypecomponentOS	1	1	5.689865	3.4813	0.0696
whattypeenterprisepayroll	1	1	3.338614	2.0427	0.1609
whatproductscommoncust	1	1	14.383974	8.8008	0.0051

Risk = 3.48 + sys-embed(1.01) + shrink-util(1.51) + comp-OS(-1.49) + ent-pay(-0.99) + prod-comcust(1.52)

Stepwise Fit - New Survey Data - Consequences (Quality)

Response:
Column 40

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

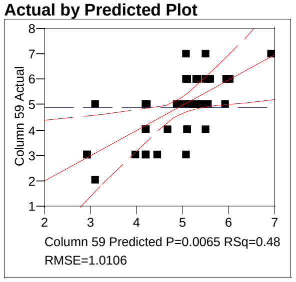
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
34.726132	34	1.0213568	0.4774	0.3236	-3.414153	10.33735

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	6.72871893	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.091289	0.087	0.7699
	X	whattypesystemsembedded{0-1}	0.63501439	1	3.517759	3.444	0.0722
		whattypesystemscommunications{0-1}	0	1	0.37393	0.359	0.5530
	X	whattypesystemsdevice{0-1}	-0.9145133	1	10.22455	10.011	0.0033
		whattypeshrinkbusiness{0-1}	0	1	0.317767	0.305	0.5846
	X	whattypeshrinkutilities{0-1}	-0.4471425	1	1.852111	1.813	0.1870
	X	whattypeshrinkinternet{0-1}	-0.4337958	1	4.585903	4.490	0.0415
		whattypecomponentdomain{0-1}	0	1	0.113248	0.108	0.7445
	X	whattypecomponentCASE{0-1}	-0.7193332	1	3.05832	2.994	0.0926
	X	whattypecomponentclass{0-1}	0.43836462	1	1.859963	1.821	0.1861
		whattypecomponentOS{0-1}	0	1	0.122281	0.117	0.7349
		whattypecomponentdevelopment{0-1}	0	1	0.277549	0.266	0.6095
		whattypeenterpriseacctng{0-1}	0	1	0.586581	0.567	0.4568
		whattypeenterprisemanufact{0-1}	0	1	0.230344	0.220	0.6419
		whattypeenterprisepayroll{0-1}	0	1	0.105161	0.100	0.7535
		whattypeenterprisescripting{0-1}	0	1	0.912346	0.890	0.3522
		whatprocessrequirements{0-1}	0	1	0.471358	0.454	0.5051
		whatprocessdesign{0-1}	0	1	0.647233	0.627	0.4342
		whatprocesstesting{0-1}	0	1	0.166293	0.159	0.6928
		whatprocessmaintenance{0-1}	0	1	0.021091	0.020	0.8882
		whatprocessreengineering{0-1}	0	1	0.05039	0.048	0.8280
		whatprocessappsuppt{0-1}	0	1	0.153121	0.146	0.7047
		whatprocesstraining{0-1}	0	1	0.430868	0.415	0.5241
	X	whatprocessspecification{0-1}	-0.4426799	1	6.209551	6.080	0.0189
	X	whatprocesscoding{0-1}	0.66742175	1	10.1736	9.961	0.0033
		whatprocessfielding{0-1}	0	1	0.445555	0.429	0.5171
		whatprocessCM{0-1}	0	1	0.01652	0.016	0.9010
		whatprocesstoolsuppt{0-1}	0	1	0.199607	0.191	0.6651
		whatprocessSWEngSuppt{0-1}	0	1	0.239718	0.229	0.6351
		whatprocessnone{0-1}	0	1	0.000075	0.000	0.9933
	X	whatproductscustom{0-1}	-0.5496736	1	6.77432	6.633	0.0145
		whatproductsCOTS{0-1}	0	1	0.895292	0.873	0.3568
		whatproductscommoncust{0-1}	0	1	0.415275	0.399	0.5317
	X	whatproductsnone{0-1}	-0.5332325	1	3.600719	3.525	0.0690

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypesystemsembedded{0-1}	Entered	0.0742	4.801587	0.0723	-6.233	2
2	whattypecomponentOS{0-1}	Entered	0.1257	3.386447	0.1232	-6.143	3
3	whatproductsnone{0-1}	Entered	0.1555	2.83092	0.1658	-5.74	4
4	whattypeshrinkutilities{0-1}	Entered	0.1411	2.956259	0.2103	-5.407	5
5	whatproductscustom{0-1}	Entered	0.1315	3.009167	0.2556	-5.104	6
6	whattypesystemsdevice{0-1}	Entered	0.2250	1.90384	0.2843	-4.178	7
7	whattypeshrinkinternet{0-1}	Entered	0.1645	2.452342	0.3212	-3.561	8
8	whatprocesscoding{0-1}	Entered	0.1273	2.859126	0.3642	-3.174	9
9	whatprocessspecification{0-1}	Entered	0.0894	3.38787	0.4152	-3.084	10
10	whattypecomponentOS{0-1}	Removed	0.5261	0.455376	0.4083	-4.828	9
11	whattypecomponentCASE{0-1}	Entered	0.1153	2.726166	0.4494	-4.365	10
12	whattypecomponentclass{0-1}	Entered	0.1861	1.859963	0.4774	-3.414	11

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.477366
RSquare Adj	0.32365
Root Mean Square Error	1.010622
Mean of Response	4.888889
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	31.718312	3.17183	3.1055
Error	34	34.726132	1.02136	Prob > F
C. Total	44	66.444444		0.0065

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	13	7.035656	0.54120	0.4104
Pure Error	21	27.690476	1.31859	Prob > F
Total Error	34	34.726132		0.9491
				Max RSq
				0.5833

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.4291488	0.403271	10.98	<.0001
whattypesystemsembedded[1-0]	-1.270029	0.684336	-1.86	0.0722
whattypesystemsdevice[1-0]	1.8290266	0.578078	3.16	0.0033
whattypeshrinkutilities[1-0]	0.894285	0.664097	1.35	0.1870
whattypeshrinkinternet[1-0]	0.8675917	0.409441	2.12	0.0415
whattypecomponentCASE[1-0]	1.4386663	0.831395	1.73	0.0926
whattypecomponentclass[1-0]	-0.876729	0.649684	-1.35	0.1861
whatprocessspecification[1-0]	0.8853598	0.359069	2.47	0.0189
whatprocesscoding[1-0]	-1.334844	0.422943	-3.16	0.0033
whatproductscustom[1-0]	1.0993473	0.426865	2.58	0.0145
whatproductsnone[1-0]	1.066465	0.56799	1.88	0.0690

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Whattypesystemsembedded	1	1	3.517759	3.4442	0.0722
Whattypesystemsdevice	1	1	10.224550	10.0108	0.0033
Whattypeshrinkutilities	1	1	1.852111	1.8134	0.1870
Whattypeshrinkinternet	1	1	4.585903	4.4900	0.0415
whattypecomponentCASE	1	1	3.058320	2.9944	0.0926
Whattypecomponentclass	1	1	1.859963	1.8211	0.1861
Whatprocessspecification	1	1	6.209551	6.0797	0.0189
Whatprocesscoding	1	1	10.173597	9.9609	0.0033
Whatproductscustom	1	1	6.774320	6.6327	0.0145
Whatproductsnone	1	1	3.600719	3.5254	0.0690

Quality = 4.43 + sys-embed(-1.27) + sys-dev(1.83) + shrink-util(0.89) + shrink-int(0.87) + comp-CASE(1.44) + comp-class(-0.88) + proc-spec(0.89) + proc-coding(-1.33) + prod-cust(1.10) + prod-none(1.07)

Stepwise Fit - New Survey Data - Consequences (Rework)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

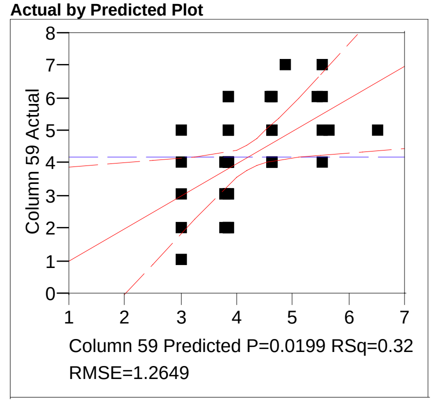
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
59.202975	37	1.6000804	0.3207	0.2106	-6.613906	27.05842

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	6.80604058	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.8344756	1	5.06396	3.165	0.0835
		whattypesystemsembedded{0-1}	0	1	0.486053	0.298	0.5885
		whattypesystemscommunications{0-1}	0	1	0.828459	0.511	0.4794
		whattypesystemsdevice{0-1}	0	1	0.139145	0.085	0.7726
		whattypeshrinkbusiness{0-1}	0	1	0.171494	0.105	0.7483
	X	whattypeshrinkutilities{0-1}	-0.9314213	1	8.929364	5.581	0.0235
		whattypeshrinkinternet{0-1}	0	1	1.961322	1.233	0.2741
		whattypecomponentdomain{0-1}	0	1	0.038458	0.023	0.8793
		whattypecomponentCASE{0-1}	0	1	0.370039	0.226	0.6371
		whattypecomponentclass{0-1}	0	1	1.020943	0.632	0.4319
		whattypecomponentOS{0-1}	0	1	0.768703	0.474	0.4958
	X	whattypecomponentdevelopment{0-1}	-0.3990426	1	3.452095	2.157	0.1503
		whattypeenterpriseacctng{0-1}	0	1	0.307692	0.188	0.6671
		whattypeenterprisemanufact{0-1}	0	1	0.004374	0.003	0.9592
		whattypeenterprisepayroll{0-1}	0	1	0.467742	0.287	0.5956
		whattypeenterprisescripting{0-1}	0	1	0.196379	0.120	0.7313
		whatprocessrequirements{0-1}	0	1	1.124333	0.697	0.4093
		whatprocessdesign{0-1}	0	1	0.348402	0.213	0.6471
		whatprocesstesting{0-1}	0	1	0.751482	0.463	0.5007
		whatprocessmaintenance{0-1}	0	1	0.196709	0.120	0.7310
		whatprocessreengineering{0-1}	0	1	0.072783	0.044	0.8345
	X	whatprocessappsuppt{0-1}	-0.391033	1	4.43294	2.770	0.1045
		whatprocesstraining{0-1}	0	1	0.007168	0.004	0.9477
		whatprocessspecification{0-1}	0	1	1.662861	1.040	0.3145
		whatprocesscoding{0-1}	0	1	0.847672	0.523	0.4743
		whatprocessfielding{0-1}	0	1	0.168414	0.103	0.7505
		whatprocessCM{0-1}	0	1	1.114467	0.691	0.4114
		whatprocesstoolsuppt{0-1}	0	1	0.002086	0.001	0.9718
	X	whatprocessSWEngSuppt{0-1}	0.41545638	1	4.785149	2.991	0.0921
	X	whatprocessnone{0-1}	-0.8344756	1	5.06396	3.165	0.0835
		whatproductscustom{0-1}	0	1	0.00178	0.001	0.9739
		whatproductsCOTS{0-1}	0	1	0.019466	0.012	0.9140
		whatproductscommoncust{0-1}	0	1	0.061345	0.037	0.8479
		whatproductsnone{0-1}	0	1	0.590495	0.363	0.5508

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeshrinkutilities{0-1}	Entered	0.0646	6.882668	0.0790	-8.29	2
2	whatprocessSWEngSuppt{0-1}	Entered	0.0690	6.294147	0.1512	-8.776	3
3	whatprocessappsuppt{0-1}	Entered	0.1627	3.560905	0.1920	-8.182	4
4	whattypesystemsavionics{0-1}	Entered	0.1564	3.579251	0.2331	-7.596	5
5	whatprocessnone{0-1}	Entered	0.1193	4.187049	0.2811	-7.25	6
6	whattypecomponentdevelopment{0-1}	Entered	0.1503	3.452095	0.3207	-6.614	7

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.320748
RSquare Adj	0.210599
Root Mean Square Error	1.264943
Mean of Response	4.204545
Observations (or Sum Wgts)	44

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	27.956115	4.65935	2.9119
Error	37	59.202975	1.60008	Prob > F
C. Total	43	87.159091		0.0199

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	5	11.932387	2.38648	1.6155
Pure Error	32	47.270588	1.47721	Prob > F
Total Error	37	59.202975		0.1842
				Max RSq
				0.4577

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.8310487	0.282973	13.54	<.0001
whattypesystemsavionics[1-0]	1.6689513	0.938144	1.78	0.0835
whattypeshrinkutilities[1-0]	1.8628427	0.788564	2.36	0.0235
whattypecomponentdevelopment[1-0]	0.7980853	0.543349	1.47	0.1503
whatprocessappsuppt[1-0]	0.7820659	0.46986	1.66	0.1045
whatprocessSWEngSuppt[1-0]	-0.830913	0.480484	-1.73	0.0921
whatprocessnone[1-0]	1.6689513	0.938144	1.78	0.0835

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	5.0639599	3.1648	0.0835
whattypeshrinkutilities	1	1	8.9293641	5.5806	0.0235
whattypecomponentdevelopment	1	1	3.4520953	2.1575	0.1503
whatprocessappsuppt	1	1	4.4329402	2.7704	0.1045
whatprocessSWEngSuppt	1	1	4.7851490	2.9906	0.0921
whatprocessnone	1	1	5.0639599	3.1648	0.0835

Rework = 3.83 + sys-avia(1.67) + shrink-util(1.86) + comp-dev(0.80) + proc-appsup(0.78) + proc-SWEngSup(-0.83) + proc-none(1.67)

Stepwise Fit - New Survey Data - Consequences (Visibility)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Current Estimates

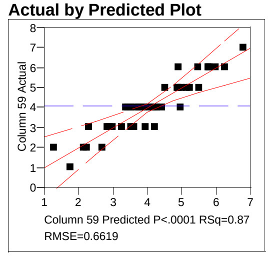
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
10.075292	23	0.4380562	0.8702	0.7630	15.946415	-22.3979

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.8495261	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.37576496	1	0.660447	1.508	0.2319
	X	whattypesystemsembedded{0-1}	-0.4488408	1	1.189113	2.715	0.1130
	X	whattypesystemscommunications{0-1}	-0.7956194	1	9.364429	21.377	0.0001
	X	whattypesystemsdevice{0-1}	-1.4740253	1	17.62745	40.240	0.0000
		whattypeshrinkbusiness{0-1}	0	1	0.005004	0.011	0.9177
	X	whattypeshrinkutilities{0-1}	1.157259	1	5.663079	12.928	0.0015
		whattypeshrinkinternet{0-1}	0	1	0.017191	0.038	0.8480
		whattypecomponentdomain{0-1}	0	1	0.217795	0.486	0.4930
	X	whattypecomponentCASE{0-1}	0.56574922	1	0.747828	1.707	0.2043
		whattypecomponentclass{0-1}	0	1	0.059492	0.131	0.7212
	X	whattypecomponentOS{0-1}	1.19102823	1	9.044565	20.647	0.0001
	X	whattypecomponentdevelopment{0-1}	-0.8669342	1	9.023453	20.599	0.0001
		whattypeenterpriseacctng{0-1}	0	1	0.015143	0.033	0.8573
		whattypeenterprisemanufact{0-1}	0	1	0.14704	0.326	0.5739
		whattypeenterprisepayroll{0-1}	0	1	0.174212	0.387	0.5402
	X	whattypeenterprisescripting{0-1}	0.65175764	1	2.443385	5.578	0.0270
		whatprocessrequirements{0-1}	0	1	0.287073	0.645	0.4304
		whatprocessdesign{0-1}	0	1	0.041276	0.091	0.7664
	X	whatprocesstesting{0-1}	-0.5517514	1	5.247883	11.980	0.0021
		whatprocessmaintenance{0-1}	0	1	0.021089	0.046	0.8319
	X	whatprocessreengineering{0-1}	0.68668548	1	8.36051	19.085	0.0002
		whatprocessappsuppt{0-1}	0	1	0.067557	0.149	0.7037
		whatprocesstraining{0-1}	0	1	0.006691	0.015	0.9049
	X	whatprocessspecification{0-1}	-0.4210337	1	3.679885	8.400	0.0081
	X	whatprocesscoding{0-1}	1.13663035	1	15.40182	35.159	0.0000
		whatprocessfielding{0-1}	0	1	0.01035	0.023	0.8818
	X	whatprocessCM{0-1}	0.66987347	1	3.521887	8.040	0.0094
		whatprocesstoolsuppt{0-1}	0	1	0.101207	0.223	0.6412
	X	whatprocessSWEngSuppt{0-1}	-1.008367	1	6.462242	14.752	0.0008
	X	whatprocessnone{0-1}	1.82147225	1	12.84536	29.324	0.0000
	X	whatproductscustom{0-1}	-0.2029011	1	0.627774	1.433	0.2435
		whatproductsCOTS{0-1}	0	1	0.236821	0.530	0.4745
	X	whatproductscommoncust{0-1}	0.29904591	1	1.1263	2.571	0.1225
	X	whatproductsnone{0-1}	-1.5076248	1	14.298	32.640	0.0000

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsCOTS{0-1}	Entered	0.0289	8.631175	0.1112	90.747	2
2	whattypeenterprisescripting{0-1}	Entered	0.1388	3.722426	0.1591	85.747	3
3	whattypecomponentdevelopment{0-1}	Entered	0.0674	5.430911	0.2291	77.534	4
4	whattypeenterprisepayroll{0-1}	Entered	0.1032	4.089892	0.2818	71.844	5
5	whattypecomponentdomain{0-1}	Entered	0.1296	3.399955	0.3256	67.45	6
6	whattypesystemsdevice{0-1}	Entered	0.1880	2.494245	0.3577	64.76	7
7	whatprocessappsuppt{0-1}	Entered	0.1186	3.397585	0.4015	60.37	8
8	whatprocesstoolsuppt{0-1}	Entered	0.1815	2.411337	0.4325	57.836	9
9	whattypesystemscommunications{0-1}	Entered	0.2307	1.904735	0.4571	56.254	10
10	whatproductsnone{0-1}	Entered	0.2128	2.025781	0.4832	54.445	11
11	whattypecomponentdomain{0-1}	Removed	0.2774	1.53092	0.4635	55.324	10
12	whatprocesstesting{0-1}	Entered	0.1021	3.387171	0.5071	50.954	11
13	whatprocesscoding{0-1}	Entered	0.0984	3.27593	0.5493	46.794	12
14	whattypeenterprisepayroll{0-1}	Removed	0.2658	1.449624	0.5306	47.52	11
15	whatprocessnone{0-1}	Entered	0.0136	6.591409	0.6155	37.125	12
16	whattypecomponentOS{0-1}	Entered	0.0538	3.533347	0.6610	32.48	13
17	whatprocessSWEngSuppt{0-1}	Entered	0.0927	2.483923	0.6930	29.809	14
18	whatprocessCM{0-1}	Entered	0.1040	2.183224	0.7212	27.704	15
19	whatproductscustom{0-1}	Entered	0.1143	1.943052	0.7462	26.05	16
20	whatproductsCOTS{0-1}	Removed	0.4063	0.519293	0.7395	25.026	15
21	whatprocessreengineering{0-1}	Entered	0.0431	2.892784	0.7768	21.587	16
22	whatprocesstoolsuppt{0-1}	Removed	0.2673	0.823332	0.7662	21.135	15
23	whattypeshrinkutilities{0-1}	Entered	0.1094	1.672484	0.7877	19.99	16
24	whatprocessspecification{0-1}	Entered	0.0578	2.167999	0.8156	17.913	17
25	whatprocessappsuppt{0-1}	Removed	0.4404	0.337895	0.8113	16.548	16
26	whattypesystemsavionics{0-1}	Entered	0.0599	1.897838	0.8357	14.979	17
27	whatproductscommoncust{0-1}	Entered	0.1454	1.056782	0.8493	14.992	18
28	whattypesystemsembedded{0-1}	Entered	0.1772	0.871866	0.8606	15.353	19
29	whattypecomponentCASE{0-1}	Entered	0.2043	0.747828	0.8702	15.946	20

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.87021
RSquare Adj	0.762993
Root Mean Square Error	0.661858
Mean of Response	4.093023
Observations (or Sum Wgts)	43

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	67.552615	3.55540	8.1163
Error	23	10.075292	0.43806	Prob > F
C. Total	42	77.627907		<.0001

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1276949	0.344614	11.98	<.0001
whattypesystemsavionics[1-0]	-0.75153	0.612057	-1.23	0.2319
whattypesystemsembedded[1-0]	0.8976816	0.544848	1.65	0.1130
whattypesystemscommunications[1-0]	1.5912387	0.344159	4.62	0.0001
whattypesystemsdevice[1-0]	2.9480506	0.464735	6.34	<.0001
whattypeshrinkutilities[1-0]	-2.314518	0.643723	-3.60	0.0015
whattypecomponentCASE[1-0]	-1.131498	0.866	-1.31	0.2043
whattypecomponentOS[1-0]	-2.382056	0.524231	-4.54	0.0001
whattypecomponentdevelopment[1-0]	1.7338685	0.382028	4.54	0.0001
whattypeenterprisescripting[1-0]	-1.303515	0.551931	-2.36	0.0270
whatprocesstesting[1-0]	1.1035028	0.318821	3.46	0.0021
whatprocessreengineering[1-0]	-1.373371	0.314367	-4.37	0.0002
whatprocessspecification[1-0]	0.8420675	0.290532	2.90	0.0081
whatprocesscoding[1-0]	-2.273261	0.383379	-5.93	<.0001
whatprocessCM[1-0]	-1.339747	0.472498	-2.84	0.0094
whatprocessSWEngSuppt[1-0]	2.0167339	0.525076	3.84	0.0008
whatprocessnone[1-0]	-3.642945	0.672735	-5.42	<.0001
whatproductscustom[1-0]	0.4058023	0.338983	1.20	0.2435
whatproductscommoncust[1-0]	-0.598092	0.372997	-1.60	0.1225
whatproductsnone[1-0]	3.0152496	0.527777	5.71	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	0.660447	1.5077	0.2319
whattypesystemsembedded	1	1	1.189113	2.7145	0.1130
whattypesystemscommunications	1	1	9.364429	21.3772	0.0001
whattypesystemsdevice	1	1	17.627454	40.2402	<.0001
whattypeshrinkutilities	1	1	5.663079	12.9277	0.0015
whattypecomponentCASE	1	1	0.747828	1.7072	0.2043
whattypecomponentOS	1	1	9.044565	20.6470	0.0001
whattypecomponentdevelopment	1	1	9.023453	20.5988	0.0001
whattypeenterprisescripting	1	1	2.443385	5.5778	0.0270
whatprocesstesting	1	1	5.247883	11.9799	0.0021
whatprocessreengineering	1	1	8.360510	19.0855	0.0002
whatprocessspecification	1	1	3.679885	8.4005	0.0081
whatprocesscoding	1	1	15.401819	35.1595	<.0001
whatprocessCM	1	1	3.521887	8.0398	0.0094
whatprocessSWEngSuppt	1	1	6.462242	14.7521	0.0008
whatprocessnone	1	1	12.845365	29.3236	<.0001
whatproductscustom	1	1	0.627774	1.4331	0.2435
whatproductscommoncust	1	1	1.126300	2.5711	0.1225
whatproductsnone	1	1	14.297998	32.6396	<.0001

Visibility = 4.13 + sys-avia(-0.75) + sys-embed(0.90) + sys-comm(1.59) + sys-dev(2.95) + shrink-util(-2.31) + comp-CASE(-1.13) + comp-OS(-2.38) + comp-dev(1.73) + ent-script(-1.30) + proc-test(1.10) + proc-reeng(-1.37) + proc-spec(0.84) + proc-coding(-2.27) + proc-CM(-1.34) + proc-SWEngSup(2.02) + proc-none(-3.64) + prod-cust(0.41) + prod-comcust(-0.60) + prod-none(3.02)

Stepwise Fit - New Survey Data - Consequences (ControlProduct)
Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

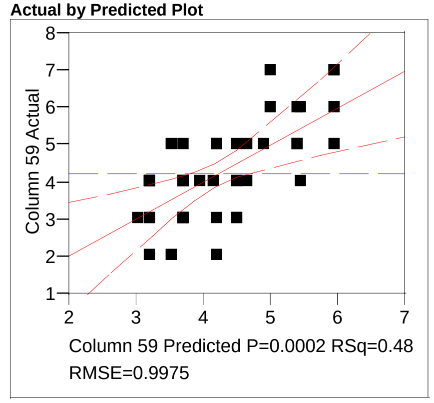
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
37.812636	38	0.9950694	0.4771	0.3945	-10.09682	6.169138

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.4580914	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.25488	0.251	0.6193
		whattypesystemsembedded{0-1}	0	1	0.051053	0.050	0.8243
		whattypesystemscommunications{0-1}	0	1	0.82343	0.824	0.3700
		whattypesystemsdevice{0-1}	0	1	0.177164	0.174	0.6788
		whattypeshrinkbusiness{0-1}	0	1	0.269405	0.266	0.6094
		whattypeshrinkutilities{0-1}	0	1	1.235669	1.250	0.2708
		whattypeshrinkinternet{0-1}	0	1	0.671233	0.669	0.4187
		whattypecomponentdomain{0-1}	0	1	0.458799	0.454	0.5044
		whattypecomponentCASE{0-1}	0	1	0.003958	0.004	0.9507
		whattypecomponentclass{0-1}	0	1	0.532813	0.529	0.4717
		whattypecomponentOS{0-1}	0	1	0.271947	0.268	0.6077
		whattypecomponentdevelopment{0-1}	0	1	0.001461	0.001	0.9700
		whattypeenterpriseacctng{0-1}	0	1	0.121053	0.119	0.7323
		whattypeenterprisemanufact{0-1}	0	1	0.036758	0.036	0.8505
		whattypeenterprisepayroll{0-1}	0	1	0.00179	0.002	0.9668
		whattypeenterprisescripting{0-1}	0	1	0.309581	0.305	0.5838
	X	whatprocessrequirements{0-1}	-0.6446867	1	10.75372	10.807	0.0022
		whatprocessdesign{0-1}	0	1	0.147606	0.145	0.7055
	X	whatprocesstesting{0-1}	0.25381386	1	2.176322	2.187	0.1474
		whatprocessmaintenance{0-1}	0	1	0.109231	0.107	0.7452
		whatprocessreengineering{0-1}	0	1	0.422917	0.419	0.5217
		whatprocessappsuppt{0-1}	0	1	0.191507	0.188	0.6668
	X	whatprocesstraining{0-1}	-0.251602	1	2.025214	2.035	0.1619
		whatprocessspecification{0-1}	0	1	0.00596	0.006	0.9395
		whatprocesscoding{0-1}	0	1	0.289823	0.286	0.5961
	X	whatprocessfielding{0-1}	1.20324177	1	14.90044	14.974	0.0004
		whatprocessCM{0-1}	0	1	0.136947	0.134	0.7159
		whatprocesstoolsuppt{0-1}	0	1	0.043319	0.042	0.8379
	X	whatprocessSWEngSuppt{0-1}	-0.4738513	1	5.33075	5.357	0.0261
		whatprocessnone{0-1}	0	1	0.548686	0.545	0.4651
		whatproductscustom{0-1}	0	1	0.063472	0.062	0.8044
		whatproductsCOTS{0-1}	0	1	0.613553	0.610	0.4397
		whatproductscommoncust{0-1}	0	1	0.011881	0.012	0.9147
	X	whatproductsnone{0-1}	-0.8482748	1	10.47251	10.524	0.0025

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessrequirements{0-1}	Entered	0.0255	8.011542	0.1108	-5.455	2
2	whatproductsnone{0-1}	Entered	0.0299	6.903736	0.2063	-7.271	3
3	whatprocessfielding{0-1}	Entered	0.0081	9.132481	0.3326	-10.32	4
4	whatprocessSWEngSuppt{0-1}	Entered	0.0194	6.239641	0.4188	-11.77	5
5	whatprocesstesting{0-1}	Entered	0.1515	2.185861	0.4491	-10.98	6
6	whatprocesstraining{0-1}	Entered	0.1619	2.025214	0.4771	-10.1	7

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.477084
RSquare Adj	0.394518
Root Mean Square Error	0.997532
Mean of Response	4.244444
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	34.498475	5.74975	5.7782
Error	38	37.812636	0.99507	Prob > F
C. Total	44	72.311111		0.0002

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	10	10.667398	1.06674	1.1003
Pure Error	28	27.145238	0.96947	Prob > F
Total Error	38	37.812636		0.3955
				Max RSq
				0.6246

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.6967322	0.278474	13.27	<.0001
whatprocessrequirements[1-0]	1.2893735	0.392217	3.29	0.0022
whatprocesstesting[1-0]	-0.507628	0.34325	-1.48	0.1474
whatprocesstraining[1-0]	0.503204	0.352724	1.43	0.1619
whatprocessfielding[1-0]	-2.406484	0.621885	-3.87	0.0004
whatprocessSWEngSuppt[1-0]	0.9477026	0.409454	2.31	0.0261
whatproductsnone[1-0]	1.6965495	0.522959	3.24	0.0025

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whatprocessrequirements	1	1	10.753721	10.8070	0.0022
whatprocesstesting	1	1	2.176322	2.1871	0.1474
whatprocesstraining	1	1	2.025214	2.0352	0.1619
whatprocessfielding	1	1	14.900445	14.9743	0.0004
whatprocessSWEngSuppt	1	1	5.330750	5.3572	0.0261
whatproductsnone	1	1	10.472506	10.5244	0.0025

ControlProduct = 3.70 + proc-req(1.29) + proc-test(-0.51) + proc-train(0.50) + proc-field(-2.41) + proc-SWEngSup(0.95) + prod-none(1.70)

Stepwise Fit - New Survey Data - Consequences (ChangeCost)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
69.585674	38	1.831202	0.3630	0.2625	-13.14053	33.61533

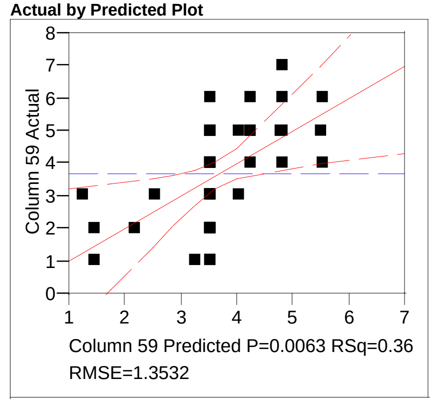
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	3.89054647	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.040887	0.022	0.8835
		whattypesystemsembedded{0-1}	0	1	0.907083	0.489	0.4889
		whattypesystemscommunications{0-1}	0	1	0.489532	0.262	0.6117
		whattypesystemsdevice{0-1}	0	1	0.276763	0.148	0.7029
		whattypeshrinkbusiness{0-1}	0	1	0.037681	0.020	0.8882
	X	whattypeshrinkutilities{0-1}	-0.6274136	1	4.234228	2.312	0.1366
		whattypeshrinkinternet{0-1}	0	1	1.522923	0.828	0.3688
		whattypecomponentdomain{0-1}	0	1	1.287347	0.697	0.4090
		whattypecomponentCASE{0-1}	0	1	1.041879	0.562	0.4580
	X	whattypecomponentclass{0-1}	1.13712109	1	12.74785	6.961	0.0120
		whattypecomponentOS{0-1}	0	1	0.001035	0.001	0.9814
		whattypecomponentdevelopment{0-1}	0	1	0.608705	0.327	0.5712
		whattypeenterpriseacctng{0-1}	0	1	0.016719	0.009	0.9254
		whattypeenterprisemanufact{0-1}	0	1	0.598182	0.321	0.5745
		whattypeenterprisepayroll{0-1}	0	1	0.456885	0.245	0.6239
		whattypeenterprisescripting{0-1}	0	1	0.557332	0.299	0.5880
		whatprocessrequirements{0-1}	0	1	0.011286	0.006	0.9387
		whatprocessdesign{0-1}	0	1	0.144105	0.077	0.7832
		whatprocesstesting{0-1}	0	1	0.950362	0.512	0.4786
		whatprocessmaintenance{0-1}	0	1	1.062279	0.574	0.4536
		whatprocessreengineering{0-1}	0	1	0.53588	0.287	0.5953
		whatprocessappsuppt{0-1}	0	1	1.81904	0.993	0.3254
		whatprocesstraining{0-1}	0	1	1.026726	0.554	0.4613
		whatprocessspecification{0-1}	0	1	1.964361	1.075	0.3066
	X	whatprocesscoding{0-1}	0.35740359	1	3.752321	2.049	0.1605
		whatprocessfielding{0-1}	0	1	0.000325	0.000	0.9896
		whatprocessCM{0-1}	0	1	0.102754	0.055	0.8163
		whatprocesstoolsuppt{0-1}	0	1	0.003435	0.002	0.9661
		whatprocessSWEngSuppt{0-1}	0	1	1.141334	0.617	0.4372
	X	whatprocessnone{0-1}	-0.9283976	1	3.85711	2.106	0.1549
		whatproductscustom{0-1}	0	1	0.076272	0.041	0.8414
		whatproductsCOTS{0-1}	0	1	0.173983	0.093	0.7624
	X	whatproductscommoncust{0-1}	-0.6468021	1	9.117309	4.979	0.0316
	X	whatproductsnone{0-1}	1.03925303	1	11.6174	6.344	0.0161

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsnone{0-1}	Entered	0.0948	6.944444	0.0636	-14.74	2
2	whatprocesscoding{0-1}	Entered	0.0514	8.942202	0.1454	-15.04	3
3	whattypecomponentclass{0-1}	Entered	0.0471	8.656957	0.2247	-15.26	4
4	whatproductscommoncust{0-1}	Entered	0.0605	7.224869	0.2908	-15.12	5
5	whattypeshrinkutilities{0-1}	Entered	0.1514	4.033188	0.3277	-14.15	6
6	whatprocessnone{0-1}	Entered	0.1549	3.85711	0.3630	-13.14	7

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.363028
RSquare Adj	0.262453
Root Mean Square Error	1.353219
Mean of Response	3.711111
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	39.65877	6.60980	3.6095
Error	38	69.58567	1.83120	Prob > F
C. Total	44	109.24444		0.0063

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	5	15.650892	3.13018	1.9152
Pure Error	33	53.934783	1.63439	Prob > F
Total Error	38	69.585674		0.1184
				Max RSq
				0.5063

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.2217108	0.485034	8.70	<.0001
whattypeshrinkutilities[1-0]	1.2548273	0.825211	1.52	0.1366
whattypecomponentclass[1-0]	-2.274242	0.861958	-2.64	0.0120
whatprocesscoding[1-0]	-0.714807	0.499352	-1.43	0.1605
whatprocessnone[1-0]	1.8567952	1.279385	1.45	0.1549
whatproductscommoncust[1-0]	1.2936042	0.579744	2.23	0.0316
whatproductsnone[1-0]	-2.078506	0.825211	-2.52	0.0161

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkutilities	1	1	4.234228	2.3123	0.1366
whattypecomponentclass	1	1	12.747855	6.9615	0.0120
whatprocesscoding	1	1	3.752321	2.0491	0.1605
whatprocessnone	1	1	3.857110	2.1063	0.1549
whatproductscommoncust	1	1	9.117309	4.9789	0.0316
whatproductsnone	1	1	11.617399	6.3441	0.0161

ChangeCost = 4.22 + shrink-util(1.25) + comp-class(-2.27) + proc-coding(-0.71) + proc-none(1.86) + prod-comcust(1.29) + prod-none(-2.08)

Stepwise Fit - New Survey Data - Consequences (LangCult)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

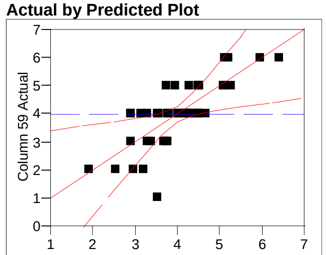
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
22.10621	29	0.7622831	0.6052	0.4147	-0.405498	-0.28657

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.32912166	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.16874	0.215	0.6462
	X	whattypesystemsembedded{0-1}	-1.227754	1	10.0837	13.228	0.0011
		whattypesystemscommunications{0-1}	0	1	0.109937	0.140	0.7112
		whattypesystemsdevice{0-1}	0	1	0.026113	0.033	0.8569
		whattypeshrinkbusiness{0-1}	0	1	0.041507	0.053	0.8201
	X	whattypeshrinkutilities{0-1}	0.83896766	1	5.061568	6.640	0.0153
		whattypeshrinkinternet{0-1}	0	1	0.396095	0.511	0.4807
	X	whattypecomponentdomain{0-1}	-0.6498443	1	3.579982	4.696	0.0386
		whattypecomponentCASE{0-1}	0	1	0.432215	0.558	0.4611
	X	whattypecomponentclass{0-1}	0.45953112	1	1.645464	2.159	0.1525
	X	whattypecomponentOS{0-1}	1.07071857	1	9.566511	12.550	0.0014
		whattypecomponentdevelopment{0-1}	0	1	0.062519	0.079	0.7802
		whattypeenterpriseacctng{0-1}	0	1	0.225621	0.289	0.5953
		whattypeenterprisemanufact{0-1}	0	1	0.25625	0.328	0.5712
	X	whattypeenterprisepayroll{0-1}	-0.8745822	1	7.322478	9.606	0.0043
		whattypeenterprisescripting{0-1}	0	1	0.094514	0.120	0.7314
		whatprocessrequirements{0-1}	0	1	0.051091	0.065	0.8008
	X	whatprocessdesign{0-1}	0.78951074	1	12.30375	16.141	0.0004
		whatprocesstesting{0-1}	0	1	0.012155	0.015	0.9021
		whatprocessmaintenance{0-1}	0	1	0.528652	0.686	0.4145
	X	whatprocessreengineering{0-1}	0.41116451	1	3.115304	4.087	0.0525
	X	whatprocessappsuppt{0-1}	0.53615387	1	6.165648	8.088	0.0081
		whatprocesstraining{0-1}	0	1	0.668773	0.874	0.3580
	X	whatprocessspecification{0-1}	-0.6586279	1	7.039915	9.235	0.0050
		whatprocesscoding{0-1}	0	1	0.63947	0.834	0.3689
	X	whatprocessfielding{0-1}	-0.5010646	1	2.178171	2.857	0.1017
	X	whatprocessCM{0-1}	-0.4352561	1	3.562696	4.674	0.0390
		whatprocesstoolsuppt{0-1}	0	1	0.0677	0.086	0.7715
		whatprocessSWEngSuppt{0-1}	0	1	0.54531	0.708	0.4072
		whatprocessnone{0-1}	0	1	0.308893	0.397	0.5339
	X	whatproductscustom{0-1}	0.31992256	1	1.99771	2.621	0.1163
		whatproductsCOTS{0-1}	0	1	0.328891	0.423	0.5208
		whatproductscommoncust{0-1}	0	1	0.000054	0.000	0.9935
	X	whatproductsnone{0-1}	0.68658062	1	5.165632	6.777	0.0144

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessdesign{0-1}	Entered	0.0611	4.538947	0.0811	-8.353	2
2	whatprocesstraining{0-1}	Entered	0.1076	3.185832	0.1379	-8.313	3
3	whatproductsnone{0-1}	Entered	0.1824	2.124874	0.1759	-7.619	4
4	whattypeenterprisepayroll{0-1}	Entered	0.1673	2.230158	0.2157	-6.991	5
5	whattypecomponentOS{0-1}	Entered	0.1182	2.76754	0.2651	-6.693	6
6	whattypecomponentclass{0-1}	Entered	0.0980	2.9736	0.3182	-6.521	7
7	whatprocesstraining{0-1}	Removed	0.3299	1.005952	0.3003	-7.903	6
8	whatprocessspecification{0-1}	Entered	0.1978	1.740741	0.3314	-6.973	7
9	whattypesystemsembedded{0-1}	Entered	0.1575	2.048578	0.3679	-6.233	8
10	whatprocessappsuppt{0-1}	Entered	0.2070	1.596211	0.3964	-5.215	9
11	whattypecomponentdomain{0-1}	Entered	0.1841	1.733516	0.4274	-4.281	10
12	whattypeshrinkutilities{0-1}	Entered	0.0760	2.960754	0.4803	-4.101	11
13	whatprocessCM{0-1}	Entered	0.1559	1.802133	0.5124	-3.21	12
14	whatproductscustom{0-1}	Entered	0.1890	1.501058	0.5392	-2.133	13
15	whattypecomponentclass{0-1}	Removed	0.2642	1.076403	0.5200	-3.471	12
16	whatprocessreengineering{0-1}	Entered	0.1771	1.558419	0.5479	-2.429	13
17	whatprocessfielding{0-1}	Entered	0.1696	1.568319	0.5759	-1.394	14
18	whattypecomponentclass{0-1}	Entered	0.1525	1.645464	0.6052	-0.405	15

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0042 RSq=0.61
RMSE=0.8731

Summary of Fit

RSquare	0.605246
RSquare Adj	0.414675
Root Mean Square Error	0.873088
Mean of Response	4
Observations (or Sum Wgts)	44

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	33.893790	2.42098	3.1760
Error	29	22.106210	0.76228	Prob > F
C. Total	43	56.000000		0.0042

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.0945421	0.35379	14.40	<.0001
whattypesystemsembedded[1-0]	2.455508	0.675133	3.64	0.0011
whattypeshrinkutilities[1-0]	-1.677935	0.651165	-2.58	0.0153
whattypecomponentdomain[1-0]	1.2996886	0.599732	2.17	0.0386
whattypecomponentclass[1-0]	-0.919062	0.625545	-1.47	0.1525
whattypecomponentOS[1-0]	-2.141437	0.604487	-3.54	0.0014
whattypeenterprisepayroll[1-0]	1.7491645	0.564365	3.10	0.0043
whatprocessdesign[1-0]	-1.579021	0.393032	-4.02	0.0004
whatprocessreengineering[1-0]	-0.822329	0.406774	-2.02	0.0525
whatprocessappsuppt[1-0]	-1.072308	0.377041	-2.84	0.0081
whatprocessspecification[1-0]	1.3172559	0.433456	3.04	0.0050
whatprocessfielding[1-0]	1.0021292	0.592838	1.69	0.1017
whatprocessCM[1-0]	0.8705122	0.402665	2.16	0.0390
whatproductscustom[1-0]	-0.639845	0.395245	-1.62	0.1163
whatproductsnone[1-0]	-1.373161	0.527495	-2.60	0.0144

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	10.083700	13.2283	0.0011
whattypeshrinkutilities	1	1	5.061568	6.6400	0.0153
whattypecomponentdomain	1	1	3.579982	4.6964	0.0386
whattypecomponentclass	1	1	1.645464	2.1586	0.1525
whattypecomponentOS	1	1	9.566511	12.5498	0.0014
whattypeenterprisepayroll	1	1	7.322478	9.6060	0.0043
whatprocessdesign	1	1	12.303747	16.1407	0.0004
whatprocessreengineering	1	1	3.115304	4.0868	0.0525
whatprocessappsuppt	1	1	6.165648	8.0884	0.0081
whatprocessspecification	1	1	7.039915	9.2353	0.0050
whatprocessfielding	1	1	2.178171	2.8574	0.1017
whatprocessCM	1	1	3.562696	4.6737	0.0390
whatproductscustom	1	1	1.997710	2.6207	0.1163
whatproductsnone	1	1	5.165632	6.7765	0.0144

LangCult = 5.09 + sys-embed(2.46) + shrink-util(-1.68) + comp-domain(1.30) + comp-class(-0.92) + comp-OS(-2.14) + ent-pay(1.75) + proc-des(-1.58) + proc-reeng(-0.82) + proc-appsup(-1.07) + proc-spec(1.32) + proc-field(1.00) + proc-CM(0.87) + prod-cust(-0.64) + prod-none(-1.37)

Stepwise Fit - New Survey Data - Consequences (TurfWar)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

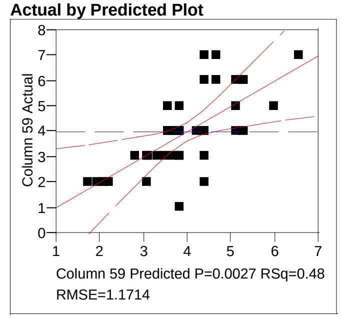
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
48.028323	35	1.3722378	0.4834	0.3506	-6.173772	22.93078

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.78177383	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.095973	0.068	0.7957
	X	whattypesystemsembedded{0-1}	-0.716114	1	5.201008	3.790	0.0596
		whattypesystemscommunications{0-1}	0	1	0.007599	0.005	0.9420
	X	whattypesystemsdevice{0-1}	0.67807578	1	5.137561	3.744	0.0611
		whattypeshrinkbusiness{0-1}	0	1	0.076437	0.054	0.8173
		whattypeshrinkutilities{0-1}	0	1	1.70838	1.254	0.2706
	X	whattypeshrinkinternet{0-1}	0.36601421	1	3.332137	2.428	0.1282
		whattypecomponentdomain{0-1}	0	1	0.030299	0.021	0.8844
		whattypecomponentCASE{0-1}	0	1	0.13776	0.098	0.7564
		whattypecomponentclass{0-1}	0	1	0.7849	0.565	0.4575
		whattypecomponentOS{0-1}	0	1	1.116724	0.809	0.3746
		whattypecomponentdevelopment{0-1}	0	1	1.253262	0.911	0.3466
		whattypeenterpriseacctng{0-1}	0	1	1.025431	0.742	0.3951
		whattypeenterprisemanufact{0-1}	0	1	0.43564	0.311	0.5806
		whattypeenterprisepayroll{0-1}	0	1	0.486418	0.348	0.5592
	X	whattypeenterprisescripting{0-1}	0.9089169	1	5.577608	4.065	0.0515
		whatprocessrequirements{0-1}	0	1	0.158059	0.112	0.7396
	X	whatprocessdesign{0-1}	0.65364789	1	10.92475	7.961	0.0078
		whatprocesstesting{0-1}	0	1	1.293867	0.941	0.3388
		whatprocessmaintenance{0-1}	0	1	0.073074	0.052	0.8213
		whatprocessreengineering{0-1}	0	1	0.565592	0.405	0.5287
		whatprocessappsuppt{0-1}	0	1	0.050432	0.036	0.8512
		whatprocesstraining{0-1}	0	1	0.041659	0.030	0.8646
		whatprocessspecification{0-1}	0	1	1.004417	0.726	0.4001
		whatprocesscoding{0-1}	0	1	0.17254	0.123	0.7284
		whatprocessfielding{0-1}	0	1	0.126291	0.090	0.7665
	X	whatprocessCM{0-1}	-0.7383293	1	8.854045	6.452	0.0157
		whatprocesstoolsuppt{0-1}	0	1	0.060059	0.043	0.8378
	X	whatprocessSWEngSuppt{0-1}	0.87281691	1	15.08296	10.992	0.0021
		whatprocessnone{0-1}	0	1	0.092105	0.065	0.7998
		whatproductscustom{0-1}	0	1	0.108546	0.077	0.7831
		whatproductsCOTS{0-1}	0	1	0.124588	0.088	0.7680
	X	whatproductscommoncust{0-1}	-0.4229876	1	3.651643	2.661	0.1118
	X	whatproductsnone{0-1}	0.72215469	1	7.357193	5.361	0.0266

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0262	10.20134	0.1097	-8.553	2
2	whatproductscommoncust{0-1}	Entered	0.0344	8.460391	0.2007	-9.869	3
3	whattypesystemsembedded{0-1}	Entered	0.0383	7.472752	0.2811	-10.8	4
4	whattypeshrinkutilities{0-1}	Entered	0.1373	3.633324	0.3202	-10.22	5
5	whatprocessCM{0-1}	Entered	0.1548	3.237583	0.3550	-9.492	6
6	whatprocessdesign{0-1}	Entered	0.1482	3.251326	0.3900	-8.766	7
7	whatproductsnone{0-1}	Entered	0.1735	2.805935	0.4201	-7.866	8
8	whattypeenterprisescripting{0-1}	Entered	0.1998	2.439374	0.4464	-6.822	9
9	whattypesystemsdevice{0-1}	Entered	0.1771	2.647484	0.4748	-5.86	10
10	whattypeshrinkinternet{0-1}	Entered	0.1838	2.50833	0.5018	-4.843	11
11	whattypeshrinkutilities{0-1}	Removed	0.2706	1.70838	0.4834	-6.174	10

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.483443
RSquare Adj	0.350614
Root Mean Square Error	1.171426
Mean of Response	3.977778
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	44.949455	4.99438	3.6396
Error	35	48.028323	1.37224	Prob > F
C. Total	44	92.977778		0.0027

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	13	14.444990	1.11115	0.7279
Pure Error	22	33.583333	1.52652	Prob > F
Total Error	35	48.028323		0.7191
				Max RSq
				0.6388

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.1059692	0.423039	12.07	<.0001
whattypesystemsembedded[1-0]	1.4322279	0.73567	1.95	0.0596
whattypesystemsdevice[1-0]	-1.356152	0.700881	-1.93	0.0611
whattypeshrinkinternet[1-0]	-0.732028	0.469766	-1.56	0.1282
whattypeenterprisescripting[1-0]	-1.817834	0.901664	-2.02	0.0515
whatprocessdesign[1-0]	-1.307296	0.463322	-2.82	0.0078
whatprocessCM[1-0]	1.4766587	0.581332	2.54	0.0157
whatprocessSWEngSuppt[1-0]	-1.745634	0.526532	-3.32	0.0021
whatproductscommoncust[1-0]	0.8459753	0.518595	1.63	0.1118
whatproductsnone[1-0]	-1.444309	0.623762	-2.32	0.0266

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	5.201008	3.7902	0.0596
whattypesystemsdevice	1	1	5.137561	3.7439	0.0611
whattypeshrinkinternet	1	1	3.332137	2.4283	0.1282
whattypeenterprisescripting	1	1	5.577608	4.0646	0.0515
whatprocessdesign	1	1	10.924751	7.9613	0.0078
whatprocessCM	1	1	8.854045	6.4523	0.0157
whatprocessSWEngSuppt	1	1	15.082964	10.9915	0.0021
whatproductscommoncust	1	1	3.651643	2.6611	0.1118
whatproductsnone	1	1	7.357193	5.3615	0.0266

TurfWar = 5.11 + sys-embed(1.43) + sys-dev(-1.36) + shrink-int(-0.73) + ent-script(-1.82) + proc-des(-1.31) + proc-CM(1.48) + proc-SWEngSup(-1.75) + prod-comcust(0.85) + prod-none(-1.44)

Stepwise Fit - New Survey Data - Consequences (FailLikely)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
22.536245	30	0.7512082	0.7548	0.6404	-1.351474	-1.11919

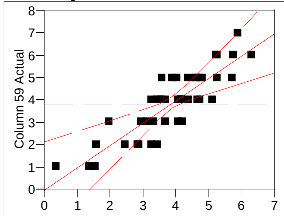
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	3.1170444	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.960316	1.291	0.2652
		whattypesystemsembedded{0-1}	0	1	0.054908	0.071	0.7920
		whattypesystemscommunications{0-1}	0	1	0.171437	0.222	0.6408
		whattypesystemsdevice{0-1}	0	1	0.141001	0.183	0.6723
	X	whattypeshrinkbusiness{0-1}	0.22845859	1	1.810994	2.411	0.1310
	X	whattypeshrinkutilities{0-1}	-1.1537391	1	10.19188	13.567	0.0009
		whattypeshrinkinternet{0-1}	0	1	0.265902	0.346	0.5608
		whattypecomponentdomain{0-1}	0	1	0.343736	0.449	0.5080
		whattypecomponentCASE{0-1}	0	1	0.023415	0.030	0.8633
	X	whattypecomponentclass{0-1}	1.37944707	1	16.20785	21.576	0.0001
		whattypecomponentOS{0-1}	0	1	0.060774	0.078	0.7814
		whattypecomponentdevelopment{0-1}	0	1	0.439882	0.577	0.4535
	X	whattypeenterpriseacctng{0-1}	0.64617145	1	4.989225	6.642	0.0151
		whattypeenterprisemanufact{0-1}	0	1	0.194504	0.252	0.6191
		whattypeenterprisepayroll{0-1}	0	1	0.12867	0.167	0.6862
	X	whattypeenterprisescripting{0-1}	1.08913498	1	7.562117	10.067	0.0035
	X	whatprocessrequirements{0-1}	-0.3250263	1	2.275132	3.029	0.0921
		whatprocessdesign{0-1}	0	1	0.000717	0.001	0.9760
	X	whatprocesstesting{0-1}	-0.2974418	1	2.568616	3.419	0.0743
	X	whatprocessmaintenance{0-1}	-0.2170486	1	1.539893	2.050	0.1626
	X	whatprocessreengineering{0-1}	-0.5392415	1	5.418224	7.213	0.0117
		whatprocessappsuppt{0-1}	0	1	0.238358	0.310	0.5820
		whatprocesstraining{0-1}	0	1	0.941234	1.264	0.2701
		whatprocessspecification{0-1}	0	1	0.348658	0.456	0.5050
		whatprocesscoding{0-1}	0	1	0.36637	0.479	0.4943
	X	whatprocessfielding{0-1}	-1.0705623	1	7.4685	9.942	0.0037
		whatprocessCM{0-1}	0	1	0.021905	0.028	0.8678
	X	whatprocesstoolsuppt{0-1}	0.60171302	1	4.465961	5.945	0.0209
	X	whatprocessSWEngSuppt{0-1}	0.79628808	1	9.425311	12.547	0.0013
		whatprocessnone{0-1}	0	1	0.07275	0.094	0.7614
		whatproductscustom{0-1}	0	1	0.000006	0.000	0.9979
	X	whatproductsCOTS{0-1}	0.37749312	1	3.021779	4.023	0.0540
	X	whatproductscommoncust{0-1}	-1.0747237	1	19.06236	25.376	0.0000
		whatproductsnone{0-1}	0	1	0.037064	0.048	0.8285

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentclass{0-1}	Entered	0.0055	15.24444	0.1659	5.4313	2
2	whatproductscommoncust{0-1}	Entered	0.0056	12.92896	0.3065	-0.399	3
3	whattypesystemscommunications{0-1}	Entered	0.0456	5.987957	0.3717	-2.025	4
4	whattypesystemsembedded{0-1}	Entered	0.0297	6.510128	0.4425	-3.968	5
5	whatprocessdesign{0-1}	Entered	0.1212	3.098888	0.4762	-3.845	6
6	whatprocesstoolsuppt{0-1}	Entered	0.1294	2.863368	0.5074	-3.579	7
7	whatprocessfielding{0-1}	Entered	0.1732	2.243077	0.5318	-2.937	8
8	whattypeenterpriseacctng{0-1}	Entered	0.1100	2.986383	0.5643	-2.746	9
9	whattypeenterprisescripting{0-1}	Entered	0.1008	3.007251	0.5970	-2.567	10
10	whatprocessmaintenance{0-1}	Entered	0.1136	2.666641	0.6260	-2.182	11
11	whatprocessSWEngSuppt{0-1}	Entered	0.1662	1.968806	0.6474	-1.375	12
12	whattypeshrinkutilities{0-1}	Entered	0.1640	1.931969	0.6684	-0.545	13
13	whattypesystemscommunications{0-1}	Removed	0.2858	1.122046	0.6562	-1.865	12
14	whatprocessreengineering{0-1}	Entered	0.0922	2.71893	0.6858	-1.512	13
15	whattypesystemsembedded{0-1}	Removed	0.3106	0.957959	0.6754	-2.932	12
16	whatproductsCOTS{0-1}	Entered	0.0671	3.010756	0.7082	-2.755	13
17	whatprocessrequirements{0-1}	Entered	0.1868	1.489446	0.7244	-1.657	14
18	whattypeshrinkbusiness{0-1}	Entered	0.1898	1.433663	0.7400	-0.525	15
19	whatprocesstesting{0-1}	Entered	0.1954	1.364919	0.7548	0.6481	16
20	whatprocessdesign{0-1}	Removed	0.9760	0.000717	0.7548	-1.351	15

Response Column 59

Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.75
RMSE=0.8667

Summary of Fit

RSquare	0.754804
RSquare Adj	0.640379
Root Mean Square Error	0.866723
Mean of Response	3.844444
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	69.374866	4.95535	6.5965
Error	30	22.536245	0.75121	Prob > F
C. Total	44	91.911111		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	22	18.536245	0.842557	1.6851
Pure Error	8	4.000000	0.500000	Prob > F
Total Error	30	22.536245		0.2271
				Max RSq
				0.9565

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.5579673	0.285331	12.47	<.0001
whattypeshrinkbusiness[1-0]	-0.456917	0.294279	-1.55	0.1310
whattypeshrinkutilities[1-0]	2.3074782	0.626456	3.68	0.0009
whattypecomponentclass[1-0]	-2.758894	0.593954	-4.64	<.0001
whattypeenterpriseacctng[1-0]	-1.292343	0.501466	-2.58	0.0151
whattypeenterprisescripting[1-0]	-2.17827	0.686547	-3.17	0.0035
whatprocessrequirements[1-0]	0.6500525	0.37353	1.74	0.0921
whatprocesstesting[1-0]	0.5948836	0.321708	1.85	0.0743
whatprocessmaintenance[1-0]	0.4340973	0.303195	1.43	0.1626
whatprocessreengineering[1-0]	1.078483	0.401573	2.69	0.0117
whatprocessfielding[1-0]	2.1411246	0.679056	3.15	0.0037
whatprocesstoolsuppt[1-0]	-1.203426	0.493562	-2.44	0.0209
whatprocessSWEngSuppt[1-0]	-1.592576	0.449606	-3.54	0.0013
whatproductsCOTS[1-0]	-0.754986	0.376433	-2.01	0.0540
whatproductscommoncust[1-0]	2.1494475	0.426696	5.04	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkbusiness	1	1	1.810994	2.4108	0.1310
whattypeshrinkutilities	1	1	10.191883	13.5673	0.0009
whattypecomponentclass	1	1	16.207850	21.5757	<.0001
whattypeenterpriseacctng	1	1	4.989225	6.6416	0.0151
whattypeenterprisescripting	1	1	7.562117	10.0666	0.0035
whatprocessrequirements	1	1	2.275132	3.0286	0.0921
whatprocesstesting	1	1	2.568616	3.4193	0.0743
whatprocessmaintenance	1	1	1.539893	2.0499	0.1626
whatprocessreengineering	1	1	5.418224	7.2127	0.0117
whatprocessfielding	1	1	7.468500	9.9420	0.0037
whatprocesstoolsuppt	1	1	4.465961	5.9450	0.0209
whatprocessSWEngSuppt	1	1	9.425311	12.5469	0.0013
whatproductsCOTS	1	1	3.021779	4.0226	0.0540
whatproductscommoncust	1	1	19.062365	25.3756	<.0001

FailLikely = 3.56 + shrink-bus(-0.46) + shrink-util(2.31) + comp-class(-2.76) + ent-acct(-1.29) + ent-script(-2.18) + proc-req(0.65) + proc-test(0.59) + proc-maint(0.43) + proc-reeng(1.08) + proc-field(2.14) + proc-toolsup(-1.20) + proc-SWEngSup(-1.59) + prod-COTS(-0.75) + prod-comcust(2.15)

Stepwise Fit - New Survey Data - Consequences (RespCust)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

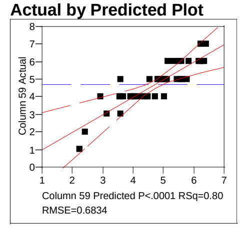
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
12.611507	27	0.4670928	0.7992	0.6727	5.1267631	-21.2424

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.08651969	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.016113	0.033	0.8567
		whattypesystemsembedded{0-1}	0	1	0.001794	0.004	0.9520
		whattypesystemscommunications{0-1}	0	1	0.091147	0.189	0.6671
		whattypesystemsdevice{0-1}	0	1	0.022034	0.046	0.8327
	X	whattypeshrinkbusiness{0-1}	0.39217631	1	4.416902	9.456	0.0048
		whattypeshrinkutilities{0-1}	0	1	0.092277	0.192	0.6652
	X	whattypeshrinkinternet{0-1}	-0.2604858	1	1.268235	2.715	0.1110
	X	whattypecomponentdomain{0-1}	-0.6828767	1	3.53688	7.572	0.0105
		whattypecomponentCASE{0-1}	0	1	0.037501	0.078	0.7829
	X	whattypecomponentclass{0-1}	1.0254731	1	7.242644	15.506	0.0005
		whattypecomponentOS{0-1}	0	1	0.00563	0.012	0.9150
		whattypecomponentdevelopment{0-1}	0	1	0.014271	0.029	0.8651
	X	whattypeenterpriseacctng{0-1}	-1.0407701	1	10.61653	22.729	0.0001
		whattypeenterprisemanufact{0-1}	0	1	0.073591	0.153	0.6992
		whattypeenterprisepayroll{0-1}	0	1	0.016593	0.034	0.8546
	X	whattypeenterprisescripting{0-1}	0.36852393	1	0.862362	1.846	0.1855
	X	whatprocessrequirements{0-1}	-0.43038	1	3.023544	6.473	0.0170
	X	whatprocessdesign{0-1}	0.29930668	1	2.106273	4.509	0.0430
		whatprocesstesting{0-1}	0	1	0.167372	0.350	0.5594
	X	whatprocessmaintenance{0-1}	0.25526518	1	1.782155	3.815	0.0612
	X	whatprocessreengineering{0-1}	0.23709166	1	1.248765	2.673	0.1136
	X	whatprocessappsuppt{0-1}	0.48597345	1	4.347448	9.307	0.0051
	X	whatprocesstraining{0-1}	-0.449339	1	4.392837	9.405	0.0049
		whatprocessspecification{0-1}	0	1	0.117749	0.245	0.6247
		whatprocesscoding{0-1}	0	1	0.186928	0.391	0.5371
		whatprocessfielding{0-1}	0	1	0.005728	0.012	0.9143
		whatprocessCM{0-1}	0	1	0.526168	1.132	0.2971
		whatprocesstoolsuppt{0-1}	0	1	0.011487	0.024	0.8788
	X	whatprocessSWEngSuppt{0-1}	-0.4809166	1	4.857045	10.398	0.0033
	X	whatprocessnone{0-1}	1.19203992	1	5.598886	11.987	0.0018
	X	whatproductscustom{0-1}	-0.4367591	1	3.225526	6.906	0.0140
		whatproductsCOTS{0-1}	0	1	0.243773	0.512	0.4805
	X	whatproductscommoncust{0-1}	-0.3363608	1	1.981869	4.243	0.0492
	X	whatproductsnone{0-1}	-1.0517744	1	7.873346	16.856	0.0003

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0179	7.754327	0.1235	20.659	2
2	whattypecomponentclass{0-1}	Entered	0.0198	6.749377	0.2310	15.099	3
3	whattypeenterpriseacctng{0-1}	Entered	0.0050	8.527066	0.3667	7.5475	4
4	whattypeshrinkinternet{0-1}	Entered	0.0308	4.428321	0.4372	4.5871	5
5	whatprocessappsuppt{0-1}	Entered	0.0798	2.707219	0.4804	3.5546	6
6	whattypecomponentdomain{0-1}	Entered	0.1129	2.114896	0.5140	3.1856	7
7	whattypeshrinkbusiness{0-1}	Entered	0.1403	1.76518	0.5421	3.2083	8
8	whatproductscustom{0-1}	Entered	0.2157	1.214735	0.5615	3.8476	9
9	whatproductsnone{0-1}	Entered	0.1512	1.596394	0.5869	4.0594	10
10	whatprocessnone{0-1}	Entered	0.0599	2.601857	0.6283	3.145	11
11	whatprocesstraining{0-1}	Entered	0.1097	1.766843	0.6565	3.1658	12
12	whatprocessmaintenance{0-1}	Entered	0.0694	2.143842	0.6906	2.7644	13
13	whatproductscommoncust{0-1}	Entered	0.1178	1.497459	0.7145	3.087	14
14	whatprocessrequirements{0-1}	Entered	0.1134	1.460493	0.7377	3.4511	15
15	whatprocessdesign{0-1}	Entered	0.1148	1.376176	0.7596	3.9096	16
16	whatprocessreengineering{0-1}	Entered	0.0770	1.621947	0.7854	4.0927	17
17	whattypeenterprisescripting{0-1}	Entered	0.1855	0.862362	0.7992	5.1268	18

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.79918
RSquare Adj	0.672737
Root Mean Square Error	0.683442
Mean of Response	4.733333
Observations (or Sum Wgts)	45

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	17	50.188493	2.95226	6.3205
Error	27	12.611507	0.46709	Prob > F
C. Total	44	62.800000		<.0001

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1727073	0.310338	13.45	<.0001
whattypeshrinkbusiness[1-0]	-0.784353	0.255067	-3.08	0.0048
whattypeshrinkinternet[1-0]	0.5209717	0.316166	1.65	0.1110
whattypecomponentdomain[1-0]	1.3657534	0.496322	2.75	0.0105
whattypecomponentclass[1-0]	-2.050946	0.520844	-3.94	0.0005
whattypeenterpriseacctng[1-0]	2.0815401	0.436611	4.77	<.0001
whattypeenterprisescripting[1-0]	-0.737048	0.542441	-1.36	0.1855
whatprocessrequirements[1-0]	0.8607599	0.338318	2.54	0.0170
whatprocessdesign[1-0]	-0.598613	0.281897	-2.12	0.0430
whatprocessmaintenance[1-0]	-0.51053	0.261367	-1.95	0.0612
whatprocessreengineering[1-0]	-0.474183	0.290006	-1.64	0.1136
whatprocessappsuppt[1-0]	-0.971947	0.318586	-3.05	0.0051
whatprocesstraining[1-0]	0.8986779	0.293044	3.07	0.0049
whatprocessSWEngSuppt[1-0]	0.9618333	0.298274	3.22	0.0033
whatprocessnone[1-0]	-2.38408	0.688607	-3.46	0.0018
whatproductscustom[1-0]	0.8735183	0.332409	2.63	0.0140
whatproductscommoncust[1-0]	0.6727217	0.326588	2.06	0.0492
whatproductsnone[1-0]	2.1035489	0.512359	4.11	0.0003

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkbusiness	1	1	4.416902	9.4562	0.0048
whattypeshrinkinternet	1	1	1.268235	2.7152	0.1110
whattypecomponentdomain	1	1	3.536880	7.5721	0.0105
whattypecomponentclass	1	1	7.242644	15.5058	0.0005
whattypeenterpriseacctng	1	1	10.616532	22.7290	<.0001
whattypeenterprisescripting	1	1	0.862362	1.8462	0.1855
whatprocessrequirements	1	1	3.023544	6.4731	0.0170
whatprocessdesign	1	1	2.106273	4.5093	0.0430
whatprocessmaintenance	1	1	1.782155	3.8154	0.0612
whatprocessreengineering	1	1	1.248765	2.6735	0.1136
whatprocessappsuppt	1	1	4.347448	9.3075	0.0051
whatprocesstraining	1	1	4.392837	9.4046	0.0049
whatprocessSWEngSuppt	1	1	4.857045	10.3985	0.0033
whatprocessnone	1	1	5.598886	11.9867	0.0018
whatproductscustom	1	1	3.225526	6.9055	0.0140
whatproductscommoncust	1	1	1.981869	4.2430	0.0492
whatproductsnone	1	1	7.873346	16.8561	0.0003

ResponseCustomer = 4.17 + shrink-bus(-0.78) + shrink-int(0.52) + comp-domain(1.37) + comp-class(-2.05) + ent-acct(2.08) + ent-script(-0.74) + proc-req(0.86) + proc-des(-0.60) + proc-maint(-0.51) + proc-reeng(-0.47) + procappsup(-0.97) + proc-train(0.90) + proc-SWEngSup(0.96) + proc-none(-2.38) + prod-cust(0.87) + prod-comcust(0.67) + prod-none(2.10)

Stepwise Fit - New Survey Data - Consequences (ResponseOrg)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
32.235426	34	0.9481008	0.5583	0.4414	-2.784289	6.310562

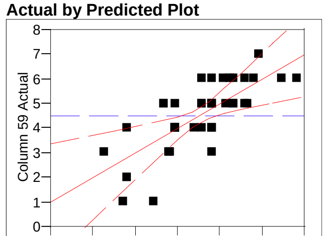
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.09677906	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	1.236373	1.316	0.2595
		whattypesystemsembedded{0-1}	0	1	0.001524	0.002	0.9687
	X	whattypesystemscommunications{0-1}	-0.4425837	1	5.680939	5.992	0.0197
		whattypesystemsdevice{0-1}	0	1	0.239672	0.247	0.6224
		whattypeshrinkbusiness{0-1}	0	1	0.371016	0.384	0.5396
	X	whattypeshrinkutilities{0-1}	0.84069034	1	6.396692	6.747	0.0138
		whattypeshrinkinternet{0-1}	0	1	0.007102	0.007	0.9326
		whattypecomponentdomain{0-1}	0	1	1.015121	1.073	0.3078
		whattypecomponentCASE{0-1}	0	1	0.04247	0.044	0.8360
	X	whattypecomponentclass{0-1}	0.60792075	1	3.396528	3.582	0.0669
		whattypecomponentOS{0-1}	0	1	0.219886	0.227	0.6372
		whattypecomponentdevelopment{0-1}	0	1	0.006482	0.007	0.9356
	X	whattypeenterpriseacctng{0-1}	-0.5096238	1	2.955505	3.117	0.0864
		whattypeenterprisemanufact{0-1}	0	1	0.093486	0.096	0.7587
		whattypeenterprisepayroll{0-1}	0	1	0.019466	0.020	0.8886
		whattypeenterprisescripting{0-1}	0	1	0.060385	0.062	0.8050
	X	whatprocessrequirements{0-1}	0.57268938	1	8.446155	8.908	0.0052
		whatprocessdesign{0-1}	0	1	0.883425	0.930	0.3419
		whatprocesstesting{0-1}	0	1	0.022992	0.024	0.8790
		whatprocessmaintenance{0-1}	0	1	0.068038	0.070	0.7933
		whatprocessreengineering{0-1}	0	1	0.031853	0.033	0.8577
		whatprocessappsuppt{0-1}	0	1	0.709158	0.742	0.3951
	X	whatprocesstraining{0-1}	-0.3111697	1	2.729817	2.879	0.0989
		whatprocessspecification{0-1}	0	1	0.043499	0.045	0.8341
		whatprocesscoding{0-1}	0	1	1.107305	1.174	0.2865
	X	whatprocessfielding{0-1}	0.76534892	1	5.501793	5.803	0.0216
		whatprocessCM{0-1}	0	1	0.511472	0.532	0.4709
		whatprocesstoolsuppt{0-1}	0	1	0.00073	0.001	0.9784
	X	whatprocessSWEngSuppt{0-1}	-1.2563025	1	29.65929	31.283	0.0000
		whatprocessnone{0-1}	0	1	0.323764	0.335	0.5668
		whatproductscustom{0-1}	0	1	0.024324	0.025	0.8755
		whatproductsCOTS{0-1}	0	1	1.01834	1.077	0.3070
		whatproductscommoncust{0-1}	0	1	0.063211	0.065	0.8006
	X	whatproductsnone{0-1}	-0.4398698	1	2.738963	2.889	0.0983

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0033	13.7068	0.1878	-0.991	2
2	whatprocessrequirements{0-1}	Entered	0.0484	5.433224	0.2623	-2.567	3
3	whattypesystemsembedded{0-1}	Entered	0.0961	3.64543	0.3122	-2.966	4
4	whattypecomponentclass{0-1}	Entered	0.1714	2.380385	0.3448	-2.533	5
5	whattypeenterpriseacctng{0-1}	Entered	0.1209	2.970161	0.3855	-2.488	6
6	whatprocessfielding{0-1}	Entered	0.1578	2.384912	0.4182	-2.057	7
7	whattypeshrinkutilities{0-1}	Entered	0.1578	2.320327	0.4500	-1.585	8
8	whattypesystemsembedded{0-1}	Removed	0.3242	1.114015	0.4348	-2.851	7
9	whattypesystemscommunications{0-1}	Entered	0.0450	4.415578	0.4953	-3.757	8
10	whatprocessappsuppt{0-1}	Entered	0.1762	1.901692	0.5213	-3.009	9
11	whatprocesstraining{0-1}	Entered	0.2294	1.47411	0.5415	-1.979	10
12	whatproductsnone{0-1}	Entered	0.1643	1.932399	0.5680	-1.251	11
13	whatprocessappsuppt{0-1}	Removed	0.3951	0.709158	0.5583	-2.784	10

Response Column 59

Actual by Predicted Plot



Column 59 Predicted P=0.0004 RSq=0.56
RMSE=0.9737

Summary of Fit

RSquare	0.558281
RSquare Adj	0.441356
Root Mean Square Error	0.973705
Mean of Response	4.522727
Observations (or Sum Wgts)	44

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	40.741846	4.52687	4.7747
Error	34	32.235426	0.94810	Prob > F
C. Total	43	72.977273		0.0004

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	12	20.243760	1.68698	3.0949
Pure Error	22	11.991667	0.54508	Prob > F
Total Error	34	32.235426		0.0105
				Max RSq
				0.8357

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.9238789	0.245094	16.01	<.0001
whattypesystemscommunications[1-0]	0.8851673	0.361612	2.45	0.0197
whattypeshrinkutilities[1-0]	-1.681381	0.647315	-2.60	0.0138
whattypecomponentclass[1-0]	-1.215841	0.642372	-1.89	0.0669
whattypeenterpriseacctng[1-0]	1.0192476	0.577286	1.77	0.0864
whatprocessrequirements[1-0]	-1.145379	0.383749	-2.98	0.0052
whatprocesstraining[1-0]	0.6223395	0.366765	1.70	0.0989
whatprocessfielding[1-0]	-1.530698	0.635425	-2.41	0.0216
whatprocessSWEngSuppt[1-0]	2.512605	0.449232	5.59	<.0001
whatproductsnone[1-0]	0.8797397	0.517593	1.70	0.0983

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	5.680939	5.9919	0.0197
whattypeshrinkutilities	1	1	6.396692	6.7468	0.0138
whattypecomponentclass	1	1	3.396528	3.5825	0.0669
whattypeenterpriseacctng	1	1	2.955505	3.1173	0.0864
whatprocessrequirements	1	1	8.446155	8.9085	0.0052
whatprocesstraining	1	1	2.729817	2.8792	0.0989
whatprocessfielding	1	1	5.501793	5.8030	0.0216
whatprocessSWEngSuppt	1	1	29.659292	31.2828	<.0001
whatproductsnone	1	1	2.738963	2.8889	0.0983

ResponseOrg = 3.92 + sys-comm(0.89) + shrink-util(-1.68) + comp-class(-1.22) + ent-acct(1.02) + proc-req(-1.15) + proc-train(0.62) + proc-field(-1.53) + proc-SWEngSup(2.51) + prod-none(0.88)

Appendix C - Old Survey Data Consequence Models

Stepwise Fit - Old Survey Data - Consequences (Cost)
Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

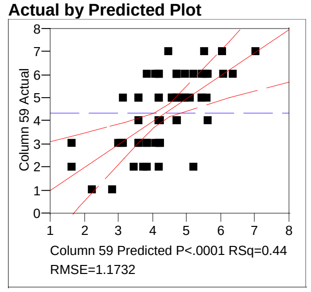
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
94.969149	69	1.3763645	0.4358	0.3458	0.4149569	36.88734

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.09503937	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.193625	0.139	0.7105
	X	whattypesystemsembedded{0-1}	0.25102501	1	2.134879	1.551	0.2172
	X	whattypesystemscommunications{0-1}	0.23248605	1	2.345615	1.704	0.1961
		whattypesystemsdevice{0-1}	0	1	1.052806	0.762	0.3857
		whattypeshrinkbusiness{0-1}	0	1	0.195847	0.141	0.7089
		whattypeshrinkutilities{0-1}	0	1	0.978239	0.708	0.4031
		whattypeshrinkinternet{0-1}	0	1	0.557187	0.401	0.5285
		whattypecomponentdomain{0-1}	0	1	1.382287	1.004	0.3198
	X	whattypecomponentCASE{0-1}	1.30855546	1	18.08818	13.142	0.0005
		whattypecomponentclass{0-1}	0	1	0.30438	0.219	0.6416
	X	whattypecomponentOS{0-1}	-0.6791525	1	7.662275	5.567	0.0211
		whattypecomponentdevelopment{0-1}	0	1	0.157871	0.113	0.7375
	X	whattypeenterpriseacctng{0-1}	-0.4615635	1	3.434004	2.495	0.1188
	X	whattypeenterprisemanufact{0-1}	-2.1425555	1	16.09787	11.696	0.0011
		whattypeenterprisepayroll{0-1}	0	1	0.30438	0.219	0.6416
	X	whattypeenterpriseOES{0-1}	0.76310751	1	4.005354	2.910	0.0925
		whattypeenterprisescripting{0-1}	0	1	0.471245	0.339	0.5623
		whattypeenterpriseweb{0-1}	0	1	0.115201	0.083	0.7747
		whatprocessrequirements{0-1}	0	1	0.289193	0.208	0.6500
		whatprocessdesign{0-1}	0	1	0.935394	0.676	0.4137
		whatprocesstesting{0-1}	0	1	0.364407	0.262	0.6105
		whatprocessmaintenance{0-1}	0	1	1.697659	1.238	0.2698
		whatprocessreengineering{0-1}	0	1	0.09262	0.066	0.7975
		whatprocessappsuppt{0-1}	0	1	1.38844	1.009	0.3187
		whatprocesstraining{0-1}	0	1	1.210716	0.878	0.3520
	X	whatprocessspecification{0-1}	-0.3654913	1	6.0284	4.380	0.0400
		whatprocessdocumentation{0-1}	0	1	0.529411	0.381	0.5390
		whatprocesscoding{0-1}	0	1	0.00051	0.000	0.9848
		whatprocessfielding{0-1}	0	1	0.085342	0.061	0.8054
	X	whatprocessCM{0-1}	0.42654828	1	7.57875	5.506	0.0218
		whatprocesstoolsuppt{0-1}	0	1	0.263119	0.189	0.6652
		whatprocessSWEngSuppt{0-1}	0	1	0.611409	0.441	0.5091
	X	whatproductscustom{0-1}	-0.5577229	1	16.44489	11.948	0.0009
	X	whatproductsCOTS{0-1}	-0.3022904	1	3.508213	2.549	0.1149
		whatproductscommoncust{0-1}	0	1	7.2e-7	0.000	0.9994
		whatproductsnone{0-1}	0	1	0.02895	0.021	0.8859

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentCASE{0-1}	Entered	0.0037	17.1415	0.1018	14.398	2
2	whatproductscustom{0-1}	Entered	0.0054	14.38782	0.1873	7.6994	3
3	whattypeenterprisemanufact{0-1}	Entered	0.0124	10.74094	0.2511	3.2058	4
4	whattypecomponentOS{0-1}	Entered	0.1069	4.266343	0.2765	2.6265	5
5	whatproductsCOTS{0-1}	Entered	0.0736	5.120923	0.3069	1.5306	6
6	whattypeenterpriseacctng{0-1}	Entered	0.0976	4.274577	0.3323	0.9463	7
7	whattypeenterpriseOES{0-1}	Entered	0.0953	4.231291	0.3574	0.3882	8
8	whatprocessspecification{0-1}	Entered	0.1755	2.740924	0.3737	0.7312	9
9	whatprocessCM{0-1}	Entered	0.0405	6.093762	0.4099	-0.953	10
10	whattypesystemscommunications{0-1}	Entered	0.2102	2.218877	0.4231	-0.294	11
11	whattypesystemsembedded{0-1}	Entered	0.2172	2.134879	0.4358	0.415	12

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.435785
RSquare Adj	0.345838
Root Mean Square Error	1.173186
Mean of Response	4.345679
Observations (or Sum Wgts)	81

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	73.35184	6.66835	4.8449
Error	69	94.96915	1.37636	Prob > F
C. Total	80	168.32099		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	22	39.695340	1.80433	1.5342
Pure Error	47	55.273810	1.17604	Prob > F
Total Error	69	94.969149		0.1087
				Max RSq
				0.6716

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.5679856	0.295303	12.08	<.0001
whattypesystemsembedded[1-0]	-0.50205	0.403113	-1.25	0.2172
whattypesystemscommunications[1-0]	-0.464972	0.356176	-1.31	0.1961
whattypecomponentCASE[1-0]	-2.617111	0.721924	-3.63	0.0005
whattypecomponentOS[1-0]	1.3583049	0.575685	2.36	0.0211
whattypeenterpriseacctng[1-0]	0.923127	0.584424	1.58	0.1188
whattypeenterprisemanufact[1-0]	4.2851109	1.252981	3.42	0.0011
whattypeenterpriseOES[1-0]	-1.526215	0.894668	-1.71	0.0925
whatprocessspecification[1-0]	0.7309825	0.349279	2.09	0.0400
whatprocessCM[1-0]	-0.853097	0.363552	-2.35	0.0218
whatproductscustom[1-0]	1.1154459	0.322701	3.46	0.0009
whatproductsCOTS[1-0]	0.6045809	0.378685	1.60	0.1149

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	2.134879	1.5511	0.2172
whattypesystemscommunications	1	1	2.345615	1.7042	0.1961
whattypecomponentCASE	1	1	18.088182	13.1420	0.0005
whattypecomponentOS	1	1	7.662275	5.5670	0.0211
whattypeenterpriseacctng	1	1	3.434004	2.4950	0.1188
whattypeenterprisemanufact	1	1	16.097871	11.6959	0.0011
whattypeenterpriseOES	1	1	4.005354	2.9101	0.0925
whatprocessspecification	1	1	6.028400	4.3799	0.0400
whatprocessCM	1	1	7.578750	5.5064	0.0218
whatproductscustom	1	1	16.444887	11.9481	0.0009
whatproductsCOTS	1	1	3.508213	2.5489	0.1149

Cost = 3.57 + (-.50)sys-embed + (-.46)sys-comm + (-2.62)comp-case + (1.36)comp-os + (.92)ent-acct + (4.29)ent-mnft + (-1.53)ent-oes + (.73)proc-spec + (-.85)proc-cm + (1.12)prod-cust + (.60)prod-cots

Stepwise Fit - Old Survey Data - Consequences (Sched)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

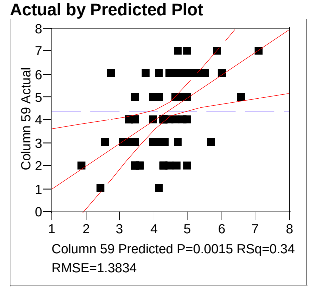
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
132.06128	69	1.9139316	0.3376	0.2320	-3.494273	63.59417

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.76088737	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.7850392	1	9.540614	4.985	0.0288
		whattypesystemsembedded{0-1}	0	1	1.324173	0.689	0.4095
	X	whattypesystemscommunications{0-1}	0.34792507	1	5.195854	2.715	0.1040
		whattypesystemsdevice{0-1}	0	1	0.906236	0.470	0.4954
	X	whattypeshrinkbusiness{0-1}	-0.3395791	1	3.550993	1.855	0.1776
		whattypeshrinkutilities{0-1}	0	1	1.563745	0.815	0.3699
		whattypeshrinkinternet{0-1}	0	1	1.59107	0.829	0.3657
		whattypecomponentdomain{0-1}	0	1	0.299425	0.155	0.6955
		whattypecomponentCASE{0-1}	0	1	0.738799	0.383	0.5383
		whattypecomponentclass{0-1}	0	1	0.022533	0.012	0.9145
		whattypecomponentOS{0-1}	0	1	0.001029	0.001	0.9817
		whattypecomponentdevelopment{0-1}	0	1	1.34129	0.698	0.4065
	X	whattypeenterpriseacctng{0-1}	0.42626338	1	3.159379	1.651	0.2032
	X	whattypeenterprisemanufact{0-1}	-1.3623693	1	6.404336	3.346	0.0717
		whattypeenterprisepayroll{0-1}	0	1	0.022533	0.012	0.9145
		whattypeenterpriseOES{0-1}	0	1	0.969841	0.503	0.4806
		whattypeenterprisescripting{0-1}	0	1	0.990601	0.514	0.4759
		whattypeenterpriseweb{0-1}	0	1	2.239416	1.173	0.2826
		whatprocessrequirements{0-1}	0	1	0.03184	0.016	0.8985
	X	whatprocessdesign{0-1}	-0.5159009	1	12.25879	6.405	0.0137
		whatprocesstesting{0-1}	0	1	0.136139	0.070	0.7919
		whatprocessmaintenance{0-1}	0	1	2.047242	1.071	0.3044
	X	whatprocessreengineering{0-1}	-0.4367876	1	7.713886	4.030	0.0486
		whatprocessappsuppt{0-1}	0	1	0.226483	0.117	0.7336
		whatprocesstraining{0-1}	0	1	0.827338	0.429	0.5148
		whatprocessspecification{0-1}	0	1	0.007269	0.004	0.9514
	X	whatprocessdocumentation{0-1}	0.4316149	1	6.45517	3.373	0.0706
		whatprocesscoding{0-1}	0	1	2.094378	1.096	0.2989
	X	whatprocessfielding{0-1}	-0.7039892	1	13.32058	6.960	0.0103
	X	whatprocessCM{0-1}	0.85920309	1	24.3518	12.723	0.0007
		whatprocesstoolsuppt{0-1}	0	1	2.428116	1.274	0.2630
		whatprocessSWEngSuppt{0-1}	0	1	0.854875	0.443	0.5079
	X	whatproductscustom{0-1}	-0.2651114	1	3.698955	1.933	0.1689
		whatproductsCOTS{0-1}	0	1	0.299977	0.155	0.6952
		whatproductscommoncust{0-1}	0	1	1.840536	0.961	0.3304
		whatproductsnone{0-1}	0	1	0.233932	0.121	0.7294

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductscustom{0-1}	Entered	0.0766	7.805393	0.0392	0.6091	2
2	whattypeshrinkbusiness{0-1}	Entered	0.0798	7.438212	0.0765	-0.405	3
3	whattypeenterpriseacctng{0-1}	Entered	0.0882	6.864043	0.1109	-1.186	4
4	whattypeenterprisemanufact{0-1}	Entered	0.1476	4.85441	0.1352	-1.152	5
5	whatprocessCM{0-1}	Entered	0.1513	4.699276	0.1588	-1.056	6
6	whatprocessdesign{0-1}	Entered	0.0850	6.634945	0.1921	-1.744	7
7	whattypecomponentdevelopment{0-1}	Entered	0.0812	6.613531	0.2253	-2.424	8
8	whattypesystemscommunications{0-1}	Entered	0.0971	5.830852	0.2545	-2.786	9
9	whatprocessfielding{0-1}	Entered	0.0973	5.684041	0.2830	-3.089	10
10	whattypesystemsavionics{0-1}	Entered	0.1254	4.748008	0.3068	-3.013	11
11	whatproductscommoncust{0-1}	Entered	0.1976	3.307965	0.3234	-2.353	12
12	whatprocessreengineering{0-1}	Entered	0.1845	3.473557	0.3409	-1.761	13
13	whatprocessdocumentation{0-1}	Entered	0.2166	2.982357	0.3558	-0.969	14
14	whattypecomponentdevelopment{0-1}	Removed	0.3361	1.799309	0.3468	-2.24	13
15	whatprocesstoolsuppt{0-1}	Entered	0.2072	3.078749	0.3622	-1.487	14
16	whatproductscommoncust{0-1}	Removed	0.2560	2.491168	0.3497	-2.478	13
17	whatprocesstoolsuppt{0-1}	Removed	0.2630	2.428116	0.3376	-3.494	12

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.337567
RSquare Adj	0.231962
Root Mean Square Error	1.383449
Mean of Response	4.395062
Observations (or Sum Wgts)	81

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	67.29675	6.11789	3.1965
Error	69	132.06128	1.91393	Prob > F
C. Total	80	199.35802		0.0015

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	32	67.84699	2.12022	1.2217
Pure Error	37	64.21429	1.73552	Prob > F
Total Error	69	132.06128		0.2771
				Max RSq
				0.6779

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.417117	0.38475	8.88	<.0001
whattypesystemsavionics[1-0]	1.5700784	0.703228	2.23	0.0288
whattypesystemscommunications[1-0]	-0.69585	0.422329	-1.65	0.1040
whattypeshrinkbusiness[1-0]	0.6791582	0.498608	1.36	0.1776
whattypeenterpriseacctng[1-0]	-0.852527	0.663545	-1.28	0.2032
whattypeenterprisemanufact[1-0]	2.7247386	1.489536	1.83	0.0717
whatprocessdesign[1-0]	1.0318019	0.407695	2.53	0.0137
whatprocessreengineering[1-0]	0.8735753	0.435138	2.01	0.0486
whatprocessdocumentation[1-0]	-0.86323	0.470041	-1.84	0.0706
whatprocessfielding[1-0]	1.4079785	0.533701	2.64	0.0103
whatprocessCM[1-0]	-1.718406	0.481752	-3.57	0.0007
whatproductscustom[1-0]	0.5302227	0.381401	1.39	0.1689

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	9.540614	4.9848	0.0288
whattypesystemscommunications	1	1	5.195854	2.7148	0.1040
whattypeshrinkbusiness	1	1	3.550993	1.8553	0.1776
whattypeenterpriseacctng	1	1	3.159379	1.6507	0.2032
whattypeenterprisemanufact	1	1	6.404336	3.3462	0.0717
whatprocessdesign	1	1	12.258794	6.4050	0.0137
whatprocessreengineering	1	1	7.713886	4.0304	0.0486
whatprocessdocumentation	1	1	6.455170	3.3727	0.0706
whatprocessfielding	1	1	13.320581	6.9598	0.0103
whatprocessCM	1	1	24.351798	12.7234	0.0007
whatproductscustom	1	1	3.698955	1.9326	0.1689

Sched = 3.42 + (1.57)sys-avia + (-.70)sys-comm + (-.68)shrink-bus + (-.85)ent-acct + (2.72)ent-mnft + (1.03)proc-des + (.87)proc-reeng + (-.86)proc-doc + (1.41)proc-field + (-1.72)proc-cm + (.53)prod-cust

Stepwise Fit - Old Survey Data - Consequences (IntelCapital)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
30.867642	64	0.4823069	0.6174	0.5337	0.380703	-44.2394

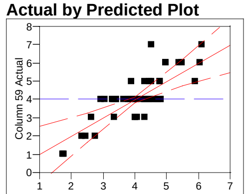
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.85966053	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.085086	0.174	0.6779
		whattypesystemsembedded{0-1}	0	1	0.03452	0.071	0.7914
		whattypesystemscommunications{0-1}	0	1	0.25992	0.535	0.4672
		whattypesystemsdevice{0-1}	0	1	0.035419	0.072	0.7888
	X	whattypeshrinkbusiness{0-1}	-0.5474613	1	8.887617	18.427	0.0001
	X	whattypeshrinkutilities{0-1}	0.49462323	1	1.624533	3.368	0.0711
		whattypeshrinkinternet{0-1}	0	1	0.087749	0.180	0.6732
	X	whattypecomponentdomain{0-1}	-0.6837601	1	7.348932	15.237	0.0002
	X	whattypecomponentCASE{0-1}	0.82830633	1	6.232985	12.923	0.0006
		whattypecomponentclass{0-1}	0	1	0.079747	0.163	0.6876
		whattypecomponentOS{0-1}	0	1	0.007463	0.015	0.9022
	X	whattypecomponentdevelopment{0-1}	0.32724112	1	4.304229	8.924	0.0040
		whattypeenterpriseacctng{0-1}	0	1	0.011283	0.023	0.8798
	X	whattypeenterprisemanufact{0-1}	-0.701835	1	1.562465	3.240	0.0766
		whattypeenterprisepayroll{0-1}	0	1	0.079747	0.163	0.6876
		whattypeenterpriseOES{0-1}	0	1	0.214318	0.440	0.5093
	X	whattypeenterprisescripting{0-1}	-0.336725	1	1.50839	3.127	0.0817
		whattypeenterpriseweb{0-1}	0	1	0.120047	0.246	0.6217
		whatprocessrequirements{0-1}	0	1	0.000857	0.002	0.9668
		whatprocessdesign{0-1}	0	1	0.017324	0.035	0.8514
		whatprocesstesting{0-1}	0	1	0.468761	0.971	0.3281
		whatprocessmaintenance{0-1}	0	1	0.006668	0.014	0.9075
	X	whatprocessreengineering{0-1}	-0.2544066	1	1.844106	3.824	0.0549
	X	whatprocessappsuppt{0-1}	-0.2971724	1	1.781561	3.694	0.0591
	X	whatprocesstraining{0-1}	-0.4768208	1	6.336608	13.138	0.0006
		whatprocessspecification{0-1}	0	1	0.172396	0.354	0.5541
		whatprocessdocumentation{0-1}	0	1	0.01511	0.031	0.8611
	X	whatprocesscoding{0-1}	0.22224395	1	1.685393	3.494	0.0662
	X	whatprocessfielding{0-1}	0.83925955	1	17.94046	37.197	0.0000
		whatprocessCM{0-1}	0	1	0.378987	0.783	0.3796
		whatprocesstoolsuppt{0-1}	0	1	0.121866	0.250	0.6190
	X	whatprocessSWEngSuppt{0-1}	0.29495325	1	3.919188	8.126	0.0059
	X	whatproductscustom{0-1}	0.14679207	1	1.176843	2.440	0.1232
		whatproductsCOTS{0-1}	0	1	0.37651	0.778	0.3811
		whatproductscommoncust{0-1}	0	1	0.573181	1.192	0.2791
		whatproductsnone{0-1}	0	1	0.557566	1.159	0.2858

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessfielding{0-1}	Entered	0.0004	12.08328	0.1498	34.744	2
2	whatprocesstraining{0-1}	Entered	0.0105	5.699798	0.2204	27.625	3
3	whattypeshrinkbusiness{0-1}	Entered	0.0258	4.06017	0.2707	23.13	4
4	whattypecomponentCASE{0-1}	Entered	0.0032	6.565	0.3521	14.628	5
5	whattypecomponentdomain{0-1}	Entered	0.0346	3.121486	0.3908	11.634	6
6	whatproductscustom{0-1}	Entered	0.0370	2.902028	0.4268	8.9916	7
7	whatprocesscoding{0-1}	Entered	0.0598	2.267616	0.4549	7.364	8
8	whattypeshrinkutilities{0-1}	Entered	0.0835	1.855673	0.4779	6.3953	9
9	whattypecomponentdevelopment{0-1}	Entered	0.1067	1.570788	0.4973	5.8824	10
10	whatprocessreengineering{0-1}	Entered	0.0760	1.848725	0.5202	4.9249	11
11	whatprocessSWEngSuppt{0-1}	Entered	0.0463	2.244364	0.5481	3.3345	12
12	whatprocessappsuppt{0-1}	Entered	0.0287	2.569127	0.5799	1.2245	13
13	whattypeenterprisemanufact{0-1}	Entered	0.0854	1.519463	0.5987	0.7938	14
14	whattypeenterprisescripting{0-1}	Entered	0.0817	1.50839	0.6174	0.3807	15

Response Column 59

Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.62
RMSE=0.6945

Summary of Fit

RSquare	0.617423
RSquare Adj	0.533735
Root Mean Square Error	0.694483
Mean of Response	4.063291
Observations (or Sum Wgts)	79

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	49.815903	3.55828	7.3776
Error	64	30.867642	0.48231	Prob > F
C. Total	78	80.683544		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	31	26.034308	0.839816	5.7339
Pure Error	33	4.833333	0.146465	Prob > F
Total Error	64	30.867642		<.0001
				Max RSq
				0.9401

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.7148988	0.24903	18.93	<.0001
whattypeshrinkbusiness[1-0]	1.0949227	0.255066	4.29	<.0001
whattypeshrinkutilities[1-0]	-0.989246	0.539016	-1.84	0.0711
whattypecomponentdomain[1-0]	1.3675202	0.350335	3.90	0.0002
whattypecomponentCASE[1-0]	-1.656613	0.460824	-3.59	0.0006
whattypecomponentdevelopment[1-0]	-0.654482	0.219085	-2.99	0.0040
whattypeenterprisemanufact[1-0]	1.40367	0.779869	1.80	0.0766
whattypeenterprisescripting[1-0]	0.67345	0.380812	1.77	0.0817
whatprocessreengineering[1-0]	0.5088132	0.260212	1.96	0.0549
whatprocessappsuppt[1-0]	0.5943447	0.309243	1.92	0.0591
whatprocesstraining[1-0]	0.9536417	0.263099	3.62	0.0006
whatprocesscoding[1-0]	-0.444488	0.237778	-1.87	0.0662
whatprocessfielding[1-0]	-1.678519	0.275214	-6.10	<.0001
whatprocessSWEngSuppt[1-0]	-0.589907	0.206941	-2.85	0.0059
whatproductscustom[1-0]	-0.293584	0.187947	-1.56	0.1232

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkbusiness	1	1	8.887617	18.4273	<.0001
whattypeshrinkutilities	1	1	1.624533	3.3683	0.0711
whattypecomponentdomain	1	1	7.348932	15.2370	0.0002
whattypecomponentCASE	1	1	6.232985	12.9233	0.0006
whattypecomponentdevelopment	1	1	4.304229	8.9243	0.0040
whattypeenterprisemanufact	1	1	1.562465	3.2396	0.0766
whattypeenterprisescripting	1	1	1.508390	3.1274	0.0817
whatprocessreengineering	1	1	1.844106	3.8235	0.0549
whatprocessappsuppt	1	1	1.781561	3.6938	0.0591
whatprocesstraining	1	1	6.336608	13.1381	0.0006
whatprocesscoding	1	1	1.685393	3.4944	0.0662
whatprocessfielding	1	1	17.940456	37.1972	<.0001
whatprocessSWEngSuppt	1	1	3.919188	8.1259	0.0059
whatproductscustom	1	1	1.176843	2.4400	0.1232

IntelCap = 4.71 + (1.09)shrink-bus + (-.99)shrink-util + (1.37)comp-domain + (-1.67)comp-case + (-.65)comp-dev + (1.40)ent-mnft + (.67)ent-script + (.51)proc-reeng + (.59)proc-appsup + (.95)proc-train + (-.44)proc-coding + (-1.68)proc-field + (-.59)proc-swengsup + (-.29)prod-cust

Stepwise Fit - Old Survey Data - Consequences (SchedFlex)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

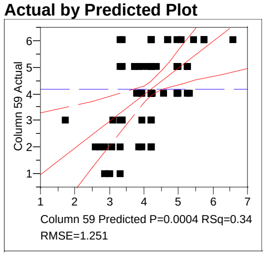
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
109.55497	70	1.5650711	0.3352	0.2498	-7.411039	45.15199

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	3.4152258	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.67585057	1	8.171748	5.221	0.0253
		whattypesystemsembedded{0-1}	0	1	0.525227	0.332	0.5661
	X	whattypesystemscommunications{0-1}	-0.5311669	1	12.28546	7.850	0.0066
		whattypesystemsdevice{0-1}	0	1	0.002158	0.001	0.9707
		whattypeshrinkbusiness{0-1}	0	1	0.216543	0.137	0.7128
		whattypeshrinkutilities{0-1}	0	1	0.747146	0.474	0.4936
		whattypeshrinkinternet{0-1}	0	1	0.556425	0.352	0.5548
		whattypecomponentdomain{0-1}	0	1	1.97971	1.270	0.2637
	X	whattypecomponentCASE{0-1}	0.76677462	1	6.282651	4.014	0.0490
		whattypecomponentclass{0-1}	0	1	0.005051	0.003	0.9552
	X	whattypecomponentOS{0-1}	0.45179531	1	3.711625	2.372	0.1281
		whattypecomponentdevelopment{0-1}	0	1	0.139061	0.088	0.7680
	X	whattypeenterpriseacctng{0-1}	-0.7581915	1	9.800447	6.262	0.0147
		whattypeenterprisemanufact{0-1}	0	1	0.147458	0.093	0.7613
		whattypeenterprisepayroll{0-1}	0	1	0.005051	0.003	0.9552
		whattypeenterpriseOES{0-1}	0	1	1.248898	0.796	0.3755
		whattypeenterprisescripting{0-1}	0	1	0.034714	0.022	0.8829
		whattypeenterpriseweb{0-1}	0	1	1.214833	0.774	0.3821
	X	whatprocessrequirements{0-1}	0.57159557	1	12.89219	8.237	0.0054
		whatprocessdesign{0-1}	0	1	0.047718	0.030	0.8628
		whatprocesstesting{0-1}	0	1	0.082181	0.052	0.8206
		whatprocessmaintenance{0-1}	0	1	0.004937	0.003	0.9557
	X	whatprocessreengineering{0-1}	-0.3797237	1	5.612145	3.586	0.0624
		whatprocessappsuppt{0-1}	0	1	0.621101	0.393	0.5326
		whatprocesstraining{0-1}	0	1	0.993241	0.631	0.4296
	X	whatprocessspecification{0-1}	-0.4325519	1	7.589665	4.849	0.0310
		whatprocessdocumentation{0-1}	0	1	0.041942	0.026	0.8713
		whatprocesscoding{0-1}	0	1	1.935249	1.241	0.2692
	X	whatprocessfielding{0-1}	0.41524402	1	6.795611	4.342	0.0408
		whatprocessCM{0-1}	0	1	1.548536	0.989	0.3234
		whatprocesstoolsuppt{0-1}	0	1	0.127274	0.080	0.7778
		whatprocessSWEngSuppt{0-1}	0	1	0.770412	0.489	0.4869
		whatproductscustom{0-1}	0	1	2.062971	1.324	0.2538
		whatproductsCOTS{0-1}	0	1	0.402375	0.254	0.6156
		whatproductscommoncust{0-1}	0	1	0.213559	0.135	0.7147
		whatproductsnone{0-1}	0	1	0.19748	0.125	0.7252

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeenterpriseacctng{0-1}	Entered	0.0242	10.45333	0.0634	-1.91	2
2	whattypesystemsavionics{0-1}	Entered	0.0683	6.560952	0.1032	-3.059	3
3	whatprocessfielding{0-1}	Entered	0.0615	6.688278	0.1438	-4.27	4
4	whattypesystemscommunications{0-1}	Entered	0.1273	4.334386	0.1701	-4.351	5
5	whattypecomponentCASE{0-1}	Entered	0.0719	5.896956	0.2059	-5.181	6
6	whatprocessreengineering{0-1}	Entered	0.1382	3.907936	0.2296	-5.057	7
7	whatprocessrequirements{0-1}	Entered	0.0582	6.213503	0.2673	-6.04	8
8	whatprocessspecification{0-1}	Entered	0.0337	7.478056	0.3127	-7.629	9
9	whattypecomponentOS{0-1}	Entered	0.1281	3.711625	0.3352	-7.411	10

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.335225
RSquare Adj	0.249754
Root Mean Square Error	1.251028
Mean of Response	4.2
Observations (or Sum Wgts)	80

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	55.24503	6.13834	3.9221
Error	70	109.55497	1.56507	Prob > F
C. Total	79	164.80000		0.0004

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	21	30.05497	1.43119	0.8821
Pure Error	49	79.50000	1.62245	Prob > F
Total Error	70	109.55497		0.6122
				Max RSq
				0.5176

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1948518	0.211127	19.87	<.0001
whattypesystemsavionics[1-0]	-1.351701	0.591548	-2.29	0.0253
whattypesystemscommunications[1-0]	1.0623337	0.379168	2.80	0.0066
whattypecomponentCASE[1-0]	-1.533549	0.765409	-2.00	0.0490
whattypecomponentOS[1-0]	-0.903591	0.586755	-1.54	0.1281
whattypeenterpriseacctng[1-0]	1.5163831	0.605973	2.50	0.0147
whatprocessrequirements[1-0]	-1.143191	0.398311	-2.87	0.0054
whatprocessreengineering[1-0]	0.7594474	0.401052	1.89	0.0624
whatprocessspecification[1-0]	0.8651039	0.392847	2.20	0.0310
whatprocessfielding[1-0]	-0.830488	0.398553	-2.08	0.0408

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	8.171748	5.2213	0.0253
whattypesystemscommunications	1	1	12.285464	7.8498	0.0066
whattypecomponentCASE	1	1	6.282651	4.0143	0.0490
whattypecomponentOS	1	1	3.711625	2.3715	0.1281
whattypeenterpriseacctng	1	1	9.800447	6.2620	0.0147
whatprocessrequirements	1	1	12.892188	8.2374	0.0054
whatprocessreengineering	1	1	5.612145	3.5859	0.0624
whatprocessspecification	1	1	7.589665	4.8494	0.0310
whatprocessfielding	1	1	6.795611	4.3420	0.0408

SchedFlex = 4.19 + sys-avia(-1.35) + sys-comm(1.06) + comp-CASE(-1.53) + comp-OS(-0.90) + ent-acct(1.52) + proc-req(-1.14) + proc-reeng(0.76) + proc-spec(0.87) + proc-field(-0.83)

Stepwise Fit - Old Survey Data - Consequences (AdminOverhead)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

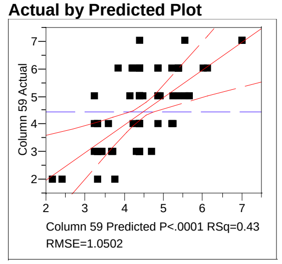
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
74.991596	68	1.1028176	0.4314	0.3394	-5.033458	18.82795

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	7.4199209	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-1.1546067	1	16.37701	14.850	0.0003
		whattypesystemsembedded{0-1}	0	1	0.007068	0.006	0.9369
		whattypesystemscommunications{0-1}	0	1	0.461255	0.415	0.5218
		whattypesystemsdevice{0-1}	0	1	0.100753	0.090	0.7649
		whattypeshrinkbusiness{0-1}	0	1	0.08897	0.080	0.7787
	X	whattypeshrinkutilities{0-1}	-1.3081713	1	11.61315	10.530	0.0018
	X	whattypeshrinkinternet{0-1}	-0.6296412	1	6.765115	6.134	0.0158
	X	whattypecomponentdomain{0-1}	0.7359386	1	6.749429	6.120	0.0159
		whattypecomponentCASE{0-1}	0	1	0.176749	0.158	0.6920
		whattypecomponentclass{0-1}	0	1	0.761108	0.687	0.4101
		whattypecomponentOS{0-1}	0	1	0.031519	0.028	0.8672
		whattypecomponentdevelopment{0-1}	0	1	0.313561	0.281	0.5976
		whattypeenterpriseacctng{0-1}	0	1	0.245723	0.220	0.6404
	X	whattypeenterprisemanufact{0-1}	-1.4334054	1	6.860332	6.221	0.0151
		whattypeenterprisepayroll{0-1}	0	1	0.761108	0.687	0.4101
	X	whattypeenterpriseOES{0-1}	0.63003481	1	2.917298	2.645	0.1085
		whattypeenterprisescripting{0-1}	0	1	0.283114	0.254	0.6160
		whattypeenterpriseweb{0-1}	0	1	0.503607	0.453	0.5032
		whatprocessrequirements{0-1}	0	1	0.285685	0.256	0.6144
		whatprocessdesign{0-1}	0	1	0.712849	0.643	0.4255
		whatprocesstesting{0-1}	0	1	0.695275	0.627	0.4313
		whatprocessmaintenance{0-1}	0	1	0.10211	0.091	0.7634
		whatprocessreengineering{0-1}	0	1	0.17891	0.160	0.6902
	X	whatprocessappsuppt{0-1}	-0.4927943	1	6.878601	6.237	0.0149
		whatprocesstraining{0-1}	0	1	0.684827	0.617	0.4348
		whatprocessspecification{0-1}	0	1	0.688505	0.621	0.4335
	X	whatprocessdocumentation{0-1}	0.53416734	1	10.29449	9.335	0.0032
		whatprocesscoding{0-1}	0	1	0.031657	0.028	0.8669
	X	whatprocessfielding{0-1}	-0.2599681	1	1.669572	1.514	0.2228
	X	whatprocessCM{0-1}	0.57812141	1	11.54136	10.465	0.0019
		whatprocesstoolsuppt{0-1}	0	1	0.969921	0.878	0.3521
		whatprocessSWEngSuppt{0-1}	0	1	0.888755	0.804	0.3732
		whatproductscustom{0-1}	0	1	0.024013	0.021	0.8840
		whatproductsCOTS{0-1}	0	1	0.030527	0.027	0.8693
	X	whatproductscommoncust{0-1}	-0.2326459	1	2.443065	2.215	0.1413
		whatproductsnone{0-1}	0	1	0.150536	0.135	0.7147

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessdocumentation{0-1}	Entered	0.0161	9.500054	0.0720	7.1782	2
2	whattypeenterprisemanufact{0-1}	Entered	0.0057	11.62637	0.1602	1.2766	3
3	whattypeshrinkutilities{0-1}	Entered	0.0235	7.280303	0.2154	-1.671	4
4	whattypesystemsavionics{0-1}	Entered	0.0892	3.935502	0.2452	-2.346	5
5	whattypeshrinkinternet{0-1}	Entered	0.1499	2.769161	0.2662	-2.228	6
6	whatprocessappsuppt{0-1}	Entered	0.1181	3.205208	0.2905	-2.406	7
7	whatprocessCM{0-1}	Entered	0.0321	5.824319	0.3347	-4.365	8
8	whattypecomponentdomain{0-1}	Entered	0.0428	4.963109	0.3723	-5.738	9
9	whatproductscommoncust{0-1}	Entered	0.0874	3.408153	0.3982	-6.054	10
10	whattypeenterpriseOES{0-1}	Entered	0.1226	2.71415	0.4187	-5.899	11
11	whatprocessfielding{0-1}	Entered	0.2228	1.669572	0.4314	-5.033	12

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.431397
RSquare Adj	0.339417
Root Mean Square Error	1.050151
Mean of Response	4.4625
Observations (or Sum Wgts)	80

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	56.89590	5.17235	4.6901
Error	68	74.99160	1.10282	Prob > F
C. Total	79	131.88750		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	19	28.389513	1.49418	1.5711
Pure Error	49	46.602083	0.95106	Prob > F
Total Error	68	74.991596		0.1030
				Max RSq
				0.6467

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.3869501	0.163375	26.85	<.0001
whattypesystemsavionics[1-0]	2.3092134	0.599237	3.85	0.0003
whattypeshrinkutilities[1-0]	2.6163426	0.806253	3.25	0.0018
whattypeshrinkinternet[1-0]	1.2592825	0.508437	2.48	0.0158
whattypecomponentdomain[1-0]	-1.471877	0.594963	-2.47	0.0159
whattypeenterprisemanufact[1-0]	2.8668109	1.149419	2.49	0.0151
whattypeenterpriseOES[1-0]	-1.26007	0.77474	-1.63	0.1085
whatprocessappsuppt[1-0]	0.9855886	0.394637	2.50	0.0149
whatprocessdocumentation[1-0]	-1.068335	0.349669	-3.06	0.0032
whatprocessfielding[1-0]	0.5199362	0.422571	1.23	0.2228
whatprocessCM[1-0]	-1.156243	0.357415	-3.24	0.0019
whatproductscommoncust[1-0]	0.4652918	0.312615	1.49	0.1413

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	16.377014	14.8502	0.0003
whattypeshrinkutilities	1	1	11.613151	10.5304	0.0018
whattypeshrinkinternet	1	1	6.765115	6.1344	0.0158
whattypecomponentdomain	1	1	6.749429	6.1202	0.0159
whattypeenterprisemanufact	1	1	6.860332	6.2207	0.0151
whattypeenterpriseOES	1	1	2.917298	2.6453	0.1085
whatprocessappsuppt	1	1	6.878601	6.2373	0.0149
whatprocessdocumentation	1	1	10.294488	9.3347	0.0032
whatprocessfielding	1	1	1.669572	1.5139	0.2228
whatprocessCM	1	1	11.541363	10.4653	0.0019
whatproductscommoncust	1	1	2.443065	2.2153	0.1413

AdminOverhead = 4.39 + sys-avia(2.31) + shrink-util(2.62) + shrink-int(1.26) + comp-domain(-1.47) + ent-mnft(2.87) + ent-OES(-1.26) + proc-appsup(.99) + proc-doc(-1.07) + proc-field(0.52) + proc-CM(-1.16) + prod-comcust(0.47)

Stepwise Fit - Old Survey Data - Consequences (ControlProcess)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
115.04467	70	1.6434952	0.3678	0.2866	-8.705161	49.0635

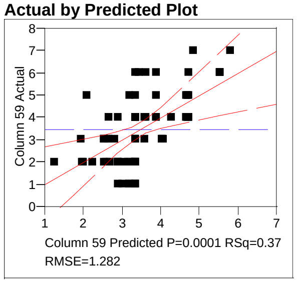
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.03142772	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	2.074114	1.267	0.2643
		whattypesystemsembedded{0-1}	0	1	0.166172	0.100	0.7530
		whattypesystemscommunications{0-1}	0	1	0.006024	0.004	0.9522
		whattypesystemsdevice{0-1}	0	1	0.107994	0.065	0.7998
		whattypeshrinkbusiness{0-1}	0	1	0.01269	0.008	0.9307
	X	whattypeshrinkutilities{0-1}	-0.9435264	1	5.266053	3.204	0.0778
		whattypeshrinkinternet{0-1}	0	1	0.31135	0.187	0.6666
	X	whattypecomponentdomain{0-1}	0.6251688	1	6.437607	3.917	0.0517
		whattypecomponentCASE{0-1}	0	1	0.260637	0.157	0.6935
		whattypecomponentclass{0-1}	0	1	0.216523	0.130	0.7194
		whattypecomponentOS{0-1}	0	1	0.525894	0.317	0.5753
	X	whattypecomponentdevelopment{0-1}	0.34640918	1	5.126021	3.119	0.0817
		whattypeenterpriseacctng{0-1}	0	1	0.094156	0.057	0.8128
		whattypeenterprisemanufact{0-1}	0	1	0.047465	0.028	0.8665
		whattypeenterprisepayroll{0-1}	0	1	0.216523	0.130	0.7194
		whattypeenterpriseOES{0-1}	0	1	0.318245	0.191	0.6631
		whattypeenterprisescripting{0-1}	0	1	0.960608	0.581	0.4485
		whattypeenterpriseweb{0-1}	0	1	0.071601	0.043	0.8364
		whatprocessrequirements{0-1}	0	1	0.830574	0.502	0.4811
	X	whatprocessdesign{0-1}	0.6918918	1	20.57616	12.520	0.0007
		whatprocesstesting{0-1}	0	1	1.967108	1.200	0.2771
		whatprocessmaintenance{0-1}	0	1	1.28478	0.779	0.3804
	X	whatprocessreengineering{0-1}	-0.7477925	1	20.08407	12.220	0.0008
		whatprocessappsuppt{0-1}	0	1	1.847033	1.126	0.2924
		whatprocesstraining{0-1}	0	1	0.600308	0.362	0.5494
	X	whatprocessspecification{0-1}	-0.2610422	1	3.014046	1.834	0.1800
		whatprocessdocumentation{0-1}	0	1	0.289843	0.174	0.6776
		whatprocesscoding{0-1}	0	1	1.656468	1.008	0.3189
		whatprocessfielding{0-1}	0	1	1.311587	0.796	0.3755
		whatprocessCM{0-1}	0	1	1.107612	0.671	0.4156
	X	whatprocesstoolsuppt{0-1}	0.33341554	1	4.539314	2.762	0.1010
		whatprocessSWEngSuppt{0-1}	0	1	0.416103	0.250	0.6183
		whatproductscustom{0-1}	0	1	0.181642	0.109	0.7422
	X	whatproductsCOTS{0-1}	0.40698632	1	5.855804	3.563	0.0632
	X	whatproductscommoncust{0-1}	0.23074774	1	2.398779	1.460	0.2311
		whatproductsnone{0-1}	0	1	0.489627	0.295	0.5888

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessdesign{0-1}	Entered	0.0032	19.33694	0.1063	-3.479	2
2	whatprocessreengineering{0-1}	Entered	0.0025	18.34199	0.2070	-9.657	3
3	whatproductscommoncust{0-1}	Entered	0.0395	7.880786	0.2503	-11.17	4
4	whattypecomponentdevelopment{0-1}	Entered	0.1523	3.701568	0.2707	-10.82	5
5	whatprocesstoolsuppt{0-1}	Entered	0.1863	3.116936	0.2878	-10.21	6
6	whattypecomponentdomain{0-1}	Entered	0.1904	3.028647	0.3045	-9.562	7
7	whatprocessspecification{0-1}	Entered	0.1685	3.313473	0.3227	-9.039	8
8	whatproductsCOTS{0-1}	Entered	0.1908	2.956437	0.3389	-8.357	9
9	whattypeshrinkutilities{0-1}	Entered	0.0778	5.266053	0.3678	-8.705	10

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.367843
RSquare Adj	0.286566
Root Mean Square Error	1.281989
Mean of Response	3.4875
Observations (or Sum Wgts)	80

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	66.94283	7.43809	4.5258
Error	70	115.04467	1.64350	Prob > F
C. Total	79	181.98750		0.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	24	53.62800	2.23450	1.6736
Pure Error	46	61.41667	1.33514	Prob > F
Total Error	70	115.04467		0.0662
				Max RSq
				0.6625

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.7136861	0.362359	13.01	<.0001
whattypeshrinkutilities[1-0]	1.8870527	1.054206	1.79	0.0778
whattypecomponentdomain[1-0]	-1.250338	0.631756	-1.98	0.0517
whattypecomponentdevelopment[1-0]	-0.692818	0.392296	-1.77	0.0817
whatprocessdesign[1-0]	-1.383784	0.391084	-3.54	0.0007
whatprocessreengineering[1-0]	1.4955849	0.427828	3.50	0.0008
whatprocessspecification[1-0]	0.5220845	0.385523	1.35	0.1800
whatprocesstoolsuppt[1-0]	-0.666831	0.401241	-1.66	0.1010
whatproductsCOTS[1-0]	-0.813973	0.431222	-1.89	0.0632
whatproductscommoncust[1-0]	-0.461495	0.381994	-1.21	0.2311

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkutilities	1	1	5.266053	3.2042	0.0778
whattypecomponentdomain	1	1	6.437607	3.9170	0.0517
whattypecomponentdevelopment	1	1	5.126021	3.1190	0.0817
whatprocessdesign	1	1	20.576158	12.5198	0.0007
whatprocessreengineering	1	1	20.084070	12.2203	0.0008
whatprocessspecification	1	1	3.014046	1.8339	0.1800
whatprocesstoolsuppt	1	1	4.539314	2.7620	0.1010
whatproductsCOTS	1	1	5.855804	3.5630	0.0632
whatproductscommoncust	1	1	2.398779	1.4596	0.2311

ControlProcess = 4.71 + shrink-util(1.89) + comp-domain(-1.25) + comp-dev(-0.69) +proc-des(-1.38) + proc-reeng(1.50) + proc-spec(0.52) + proc-toolsup(-0.67) + prod-COTS(-0.81) + prod-comcust(-0.46)

Stepwise Fit - Old Survey Data - Consequences (InhouseNonCore)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
76.23804	67	1.1378812	0.3996	0.3100	-4.042264	20.21783

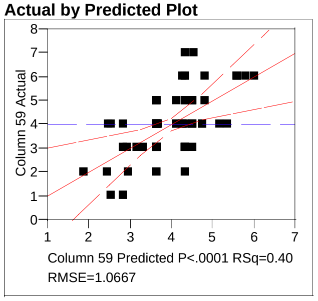
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.05266848	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.60304818	1	5.955562	5.234	0.0253
		whattypesystemsembedded{0-1}	0	1	1.112126	0.977	0.3265
		whattypesystemscommunications{0-1}	0	1	0.094749	0.082	0.7753
		whattypesystemsdevice{0-1}	0	1	0.129358	0.112	0.7387
		whattypeshrinkbusiness{0-1}	0	1	0.77388	0.677	0.4136
		whattypeshrinkutilities{0-1}	0	1	1.395702	1.231	0.2713
		whattypeshrinkinternet{0-1}	0	1	0.751067	0.657	0.4206
		whattypecomponentdomain{0-1}	0	1	0.69316	0.606	0.4392
		whattypecomponentCASE{0-1}	0	1	0.075683	0.066	0.7987
		whattypecomponentclass{0-1}	0	1	0.000966	0.001	0.9770
		whattypecomponentOS{0-1}	0	1	0.050639	0.044	0.8347
	X	whattypecomponentdevelopment{0-1}	-0.2397377	1	2.287103	2.010	0.1609
	X	whattypeenterpriseacctng{0-1}	-0.4283596	1	2.999612	2.636	0.1092
	X	whattypeenterprisemanufact{0-1}	-1.1718055	1	5.048142	4.436	0.0389
		whattypeenterprisepayroll{0-1}	0	1	0.000966	0.001	0.9770
	X	whattypeenterpriseOES{0-1}	0.90718493	1	5.577901	4.902	0.0302
		whattypeenterprisescripting{0-1}	0	1	0.411367	0.358	0.5516
	X	whattypeenterpriseweb{0-1}	-0.3081043	1	3.008214	2.644	0.1087
		whatprocessrequirements{0-1}	0	1	0.002677	0.002	0.9617
		whatprocessdesign{0-1}	0	1	0.292839	0.254	0.6156
		whatprocesstesting{0-1}	0	1	0.579725	0.506	0.4795
		whatprocessmaintenance{0-1}	0	1	0.009492	0.008	0.9280
		whatprocessreengineering{0-1}	0	1	0.00165	0.001	0.9700
		whatprocessappsuppt{0-1}	0	1	0.594047	0.518	0.4741
		whatprocesstraining{0-1}	0	1	0.777955	0.680	0.4124
		whatprocessspecification{0-1}	0	1	0.251669	0.219	0.6417
		whatprocessdocumentation{0-1}	0	1	0.048766	0.042	0.8378
		whatprocesscoding{0-1}	0	1	0.127047	0.110	0.7410
		whatprocessfielding{0-1}	0	1	1.263076	1.112	0.2955
		whatprocessCM{0-1}	0	1	0.161346	0.140	0.7095
	X	whatprocesstoolsuppt{0-1}	0.41502599	1	6.432741	5.653	0.0203
	X	whatprocessSWEngSuppt{0-1}	-0.4251425	1	8.94256	7.859	0.0066
		whatproductscustom{0-1}	0	1	0.460933	0.401	0.5285
	X	whatproductsCOTS{0-1}	-0.3367	1	4.988808	4.384	0.0401
		whatproductscommoncust{0-1}	0	1	1.234165	1.086	0.3012
	X	whatproductsnone{0-1}	0.56807799	1	2.427014	2.133	0.1488

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeenterpriseweb{0-1}	Entered	0.0121	10.15385	0.0800	5.6242	2
2	whatproductsCOTS{0-1}	Entered	0.0256	7.554217	0.1394	2.4759	3
3	whattypeenterprisemanufact{0-1}	Entered	0.0501	5.558983	0.1832	0.6873	4
4	whatprocessfielding{0-1}	Entered	0.0716	4.540449	0.2190	-0.407	5
5	whattypesystemsavionics{0-1}	Entered	0.0743	4.322517	0.2530	-1.353	6
6	whatprocessSWEngSuppt{0-1}	Entered	0.0448	5.264054	0.2945	-2.941	7
7	whatprocesstoolsuppt{0-1}	Entered	0.0544	4.645265	0.3311	-4.106	8
8	whatproductsnone{0-1}	Entered	0.1157	3.014268	0.3548	-4.161	9
9	whattypeenterpriseOES{0-1}	Entered	0.1774	2.178614	0.3719	-3.645	10
10	whattypeenterpriseacctng{0-1}	Entered	0.1442	2.51728	0.3918	-3.361	11
11	whatprocessfielding{0-1}	Removed	0.2944	1.287458	0.3816	-4.484	10
12	whattypecomponentdevelopment{0-1}	Entered	0.1609	2.287103	0.3996	-4.042	11

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.39964
RSquare Adj	0.310034
Root Mean Square Error	1.066715
Mean of Response	3.987179
Observations (or Sum Wgts)	78

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	50.74914	5.07491	4.4600
Error	67	76.23804	1.13788	Prob > F
C. Total	77	126.98718		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	16	20.952326	1.30952	1.2080
Pure Error	51	55.285714	1.08403	Prob > F
Total Error	67	76.238040		0.2944
				Max RSq
				0.5646

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.636156	0.190425	19.09	<.0001
whattypesystemsavionics[1-0]	-1.206096	0.527192	-2.29	0.0253
whattypecomponentdevelopment[1-0]	0.4794754	0.338199	1.42	0.1609
whattypeenterpriseacctng[1-0]	0.8567193	0.52766	1.62	0.1092
whattypeenterprisemanufact[1-0]	2.343611	1.112675	2.11	0.0389
whattypeenterpriseOES[1-0]	-1.81437	0.819481	-2.21	0.0302
whattypeenterpriseweb[1-0]	0.6162086	0.378985	1.63	0.1087
whatprocesstoolsuppt[1-0]	-0.830052	0.349105	-2.38	0.0203
whatprocessSWEngSuppt[1-0]	0.850285	0.303307	2.80	0.0066
whatproductsCOTS[1-0]	0.6733999	0.321605	2.09	0.0401
whatproductsnone[1-0]	-1.136156	0.777947	-1.46	0.1488

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	5.9555625	5.2339	0.0253
whattypecomponentdevelopment	1	1	2.2871033	2.0100	0.1609
whattypeenterpriseacctng	1	1	2.9996120	2.6361	0.1092
whattypeenterprisemanufact	1	1	5.0481421	4.4364	0.0389
whattypeenterpriseOES	1	1	5.5779009	4.9020	0.0302
whattypeenterpriseweb	1	1	3.0082137	2.6437	0.1087
whatprocesstoolsuppt	1	1	6.4327412	5.6533	0.0203
whatprocessSWEngSuppt	1	1	8.9425598	7.8590	0.0066
whatproductsCOTS	1	1	4.9888077	4.3843	0.0401
whatproductsnone	1	1	2.4270141	2.1329	0.1488

InhouseNonCore = 3.64 + sys-avia(-1.21) + comp-dev(0.48) + ent-acct(0.86) + ent-mnft(2.34) + ent-OES(-1.81) + ent-web(0.62) + proc-toolsup(-0.83) + proc-SWEngSup(0.85) + prod-COTS(0.67) + prod-none(-1.14)

Stepwise Fit - Old Survey Data - Consequences (InhouseTurnover)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

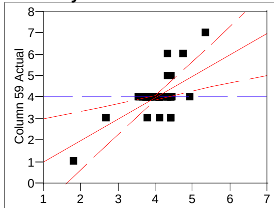
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
20.108654	67	0.3001292	0.4236	0.3290	-1.917523	-84.0955

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.95393134	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.22717178	1	0.84964	2.831	0.0971
		whattypesystemsembedded{0-1}	0	1	0.105511	0.348	0.5572
		whattypesystemscommunications{0-1}	0	1	0.096503	0.318	0.5746
	X	whattypesystemsdevice{0-1}	0.21799118	1	0.68082	2.268	0.1367
	X	whattypeshrinkbusiness{0-1}	0.26796463	1	2.111955	7.037	0.0100
		whattypeshrinkutilities{0-1}	0	1	0.076623	0.252	0.6170
		whattypeshrinkinternet{0-1}	0	1	0.001559	0.005	0.9432
		whattypecomponentdomain{0-1}	0	1	0.045673	0.150	0.6995
	X	whattypecomponentCASE{0-1}	0.44251331	1	1.705531	5.683	0.0200
		whattypecomponentclass{0-1}	0	1	0.001236	0.004	0.9494
		whattypecomponentOS{0-1}	0	1	0.003064	0.010	0.9204
		whattypecomponentdevelopment{0-1}	0	1	0.223144	0.741	0.3926
	X	whattypeenterpriseacctng{0-1}	-0.3015485	1	1.518858	5.061	0.0278
		whattypeenterprisemanufact{0-1}	0	1	0.165526	0.548	0.4618
		whattypeenterprisepayroll{0-1}	0	1	0.001236	0.004	0.9494
	X	whattypeenterpriseOES{0-1}	0.32671654	1	0.733246	2.443	0.1228
	X	whattypeenterprisescripting{0-1}	0.21714431	1	0.616033	2.053	0.1566
		whattypeenterpriseweb{0-1}	0	1	0.02785	0.092	0.7632
		whatprocessrequirements{0-1}	0	1	0.107489	0.355	0.5535
	X	whatprocessdesign{0-1}	0.10946224	1	0.548418	1.827	0.1810
		whatprocesstesting{0-1}	0	1	0.161196	0.533	0.4678
	X	whatprocessmaintenance{0-1}	0.17301282	1	1.621516	5.403	0.0231
		whatprocessreengineering{0-1}	0	1	0.030023	0.099	0.7544
		whatprocessappsuppt{0-1}	0	1	0.371469	1.242	0.2691
		whatprocesstraining{0-1}	0	1	0.147712	0.488	0.4871
		whatprocessspecification{0-1}	0	1	0.036901	0.121	0.7287
		whatprocessdocumentation{0-1}	0	1	0.058968	0.194	0.6610
		whatprocesscoding{0-1}	0	1	0.127897	0.422	0.5180
		whatprocessfielding{0-1}	0	1	0.16686	0.552	0.4600
	X	whatprocessCM{0-1}	-0.1637265	1	0.970396	3.233	0.0767
		whatprocesstoolsuppt{0-1}	0	1	0.053137	0.175	0.6772
	X	whatprocessSWEngSuppt{0-1}	-0.1579166	1	1.360082	4.532	0.0370
		whatproductscustom{0-1}	0	1	0.017059	0.056	0.8136
		whatproductsCOTS{0-1}	0	1	0.011916	0.039	0.8438
		whatproductscommoncust{0-1}	0	1	0.054486	0.179	0.6733
		whatproductsnone{0-1}	0	1	0.308644	1.029	0.3141

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentCASE{0-1}	Entered	0.0002	5.864146	0.1681	1.6116	2
2	whatprocessSWEngSuppt{0-1}	Entered	0.0491	1.450896	0.2097	-0.218	3
3	whattypesystemsdevice{0-1}	Entered	0.0530	1.351052	0.2484	-1.785	4
4	whattypeshrinkbusiness{0-1}	Entered	0.0674	1.166644	0.2819	-2.865	5
5	whattypeenterpriseacctng{0-1}	Entered	0.0485	1.30977	0.3194	-4.322	6
6	whatprocessmaintenance{0-1}	Entered	0.1051	0.856237	0.3439	-4.582	7
7	whattypeenterprisescripting{0-1}	Entered	0.1746	0.590655	0.3609	-4.142	8
8	whattypesystemsavionics{0-1}	Entered	0.2280	0.461396	0.3741	-3.36	9
9	whatprocessCM{0-1}	Entered	0.1689	0.595006	0.3912	-2.93	10
10	whattypeenterpriseOES{0-1}	Entered	0.1704	0.583203	0.4079	-2.47	11
11	whatprocessdesign{0-1}	Entered	0.1810	0.548418	0.4236	-1.918	12

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.42
RMSE=0.5478

Summary of Fit

RSquare	0.423591
RSquare Adj	0.328956
Root Mean Square Error	0.54784
Mean of Response	4.037975
Observations (or Sum Wgts)	79

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	14.777422	1.34340	4.4761
Error	67	20.108654	0.30013	Prob > F
C. Total	78	34.886076		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	21	9.999130	0.476149	2.1666
Pure Error	46	10.109524	0.219772	Prob > F
Total Error	67	20.108654		0.0145
				Max RSq
				0.7102

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.3127166	0.146456	29.45	<.0001
whattypesystemsavionics[1-0]	-0.454344	0.270036	-1.68	0.0971
whattypesystemsdevice[1-0]	-0.435982	0.289472	-1.51	0.1367
whattypeshrinkbusiness[1-0]	-0.535929	0.202032	-2.65	0.0100
whattypecomponentCASE[1-0]	-0.885027	0.371262	-2.38	0.0200
whattypeenterpriseacctng[1-0]	0.603097	0.268091	2.25	0.0278
whattypeenterpriseOES[1-0]	-0.653433	0.418052	-1.56	0.1228
whattypeenterprisescripting[1-0]	-0.434289	0.303131	-1.43	0.1566
whatprocessdesign[1-0]	-0.218924	0.161954	-1.35	0.1810
whatprocessmaintenance[1-0]	-0.346026	0.148868	-2.32	0.0231
whatprocessCM[1-0]	0.3274531	0.182108	1.80	0.0767
whatprocessSWEngSuppt[1-0]	0.3158332	0.148364	2.13	0.0370

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	0.8496399	2.8309	0.0971
whattypesystemsdevice	1	1	0.6808203	2.2684	0.1367
whattypeshrinkbusiness	1	1	2.1119545	7.0368	0.0100
whattypecomponentCASE	1	1	1.7055312	5.6827	0.0200
whattypeenterpriseacctng	1	1	1.5188578	5.0607	0.0278
whattypeenterpriseOES	1	1	0.7332455	2.4431	0.1228
whattypeenterprisescripting	1	1	0.6160329	2.0526	0.1566
whatprocessdesign	1	1	0.5484179	1.8273	0.1810
whatprocessmaintenance	1	1	1.6215155	5.4027	0.0231
whatprocessCM	1	1	0.9703965	3.2333	0.0767
whatprocessSWEngSuppt	1	1	1.3600824	4.5317	0.0370

InhouseTurnover = 4.31 + sys-avia(-0.45) + sys-dev(-0.44) + shrink-bus(-0.54) + comp-CASE(-0.89) + ent-acct(0.60) + ent-OES(-0.65) + ent-script(-0.43) + proc-des(-0.22) + proc-maint(-0.35) + proc-CM(0.33) + proc-SWEngSup(0.32)

Stepwise Fit - Old Survey Data - Consequences (LearningCurve)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

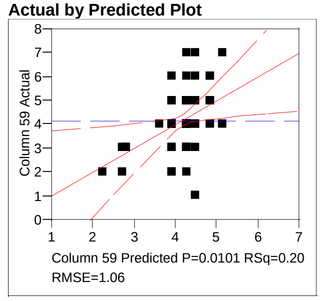
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
80.893033	72	1.1235143	0.2032	0.1368	-12.97511	15.87071

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.71713895	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.00014	0.000	0.9912
		whattypesystemsembedded{0-1}	0	1	0.061453	0.054	0.8169
		whattypesystemscommunications{0-1}	0	1	0.010547	0.009	0.9236
		whattypesystemsdevice{0-1}	0	1	0.046311	0.041	0.8408
		whattypeshrinkbusiness{0-1}	0	1	0.38614	0.341	0.5614
		whattypeshrinkutilities{0-1}	0	1	0.273315	0.241	0.6252
		whattypeshrinkinternet{0-1}	0	1	0.048634	0.043	0.8369
		whattypecomponentdomain{0-1}	0	1	0.259912	0.229	0.6338
	X	whattypecomponentCASE{0-1}	0.77915246	1	6.426484	5.720	0.0194
	X	whattypecomponentclass{0-1}	0.7420407	1	3.142977	2.797	0.0988
		whattypecomponentOS{0-1}	0	1	0.725277	0.642	0.4255
		whattypecomponentdevelopment{0-1}	0	1	0.239404	0.211	0.6476
		whattypeenterpriseacctng{0-1}	0	1	1.445996	1.292	0.2595
		whattypeenterprisemanufact{0-1}	0	1	0.223971	0.197	0.6584
		whattypeenterprisepayroll{0-1}	0	0	0	.	.
	X	whattypeenterpriseOES{0-1}	0.56033792	1	1.841381	1.639	0.2046
	X	whattypeenterprisescripting{0-1}	-0.4359535	1	2.614876	2.327	0.1315
		whattypeenterpriseweb{0-1}	0	1	0.004971	0.004	0.9475
		whatprocessrequirements{0-1}	0	1	0.06517	0.057	0.8116
		whatprocessdesign{0-1}	0	1	0.790721	0.701	0.4053
		whatprocesstesting{0-1}	0	1	0.003366	0.003	0.9568
	X	whatprocessmaintenance{0-1}	0.18170279	1	2.200086	1.958	0.1660
		whatprocessreengineering{0-1}	0	1	0.455925	0.402	0.5279
		whatprocessappsuppt{0-1}	0	1	0.035675	0.031	0.8600
		whatprocesstraining{0-1}	0	1	0.008131	0.007	0.9329
		whatprocessspecification{0-1}	0	1	0.588197	0.520	0.4732
		whatprocessdocumentation{0-1}	0	1	0.178102	0.157	0.6934
		whatprocesscoding{0-1}	0	1	0.747153	0.662	0.4186
		whatprocessfielding{0-1}	0	1	0.049553	0.044	0.8353
		whatprocessCM{0-1}	0	1	0.048057	0.042	0.8378
		whatprocesstoolsuppt{0-1}	0	1	0.00153	0.001	0.9709
		whatprocessSWEngSuppt{0-1}	0	1	0.024241	0.021	0.8844
		whatproductscustom{0-1}	0	1	1.179177	1.050	0.3089
		whatproductsCOTS{0-1}	0	1	0.369487	0.326	0.5700
	X	whatproductscommoncust{0-1}	-0.2767501	1	4.097259	3.647	0.0602
		whatproductsnone{0-1}	0	1	1.245628	1.110	0.2956

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentclass{0-1}	Entered	0.0343	5.772234	0.0569	-13.42	2
2	whattypecomponentCASE{0-1}	Entered	0.0525	4.652159	0.1027	-14.41	3
3	whatprocessreengineering{0-1}	Entered	0.1175	2.946976	0.1317	-14.31	4
4	whattypeenterprisescripting{0-1}	Entered	0.1551	2.391469	0.1553	-13.85	5
5	whatproductscommoncust{0-1}	Entered	0.1640	2.260892	0.1775	-13.3	6
6	whatprocessmaintenance{0-1}	Entered	0.2405	1.593321	0.1932	-12.33	7
7	whatprocessreengineering{0-1}	Removed	0.3951	0.832478	0.1850	-13.79	6
8	whattypeenterpriseOES{0-1}	Entered	0.2046	1.841381	0.2032	-12.98	7

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.203173
RSquare Adj	0.136771
Root Mean Square Error	1.05996
Mean of Response	4.177215
Observations (or Sum Wgts)	79

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	20.62595	3.43766	3.0597
Error	72	80.89303	1.12351	Prob > F
C. Total	78	101.51899		0.0101

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	3	0.839604	0.27987	0.2412
Pure Error	69	80.053429	1.16019	Prob > F
Total Error	72	80.893033		0.8673
				Max RSq
				0.2114

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.2676693	0.173822	24.55	<.0001
whattypecomponentCASE[1-0]	-1.558305	0.651561	-2.39	0.0194
whattypecomponentclass[1-0]	-1.484081	0.887312	-1.67	0.0988
whattypeenterpriseOES[1-0]	-1.120676	0.875382	-1.28	0.2046
whattypeenterprisescripting[1-0]	0.871907	0.571523	1.53	0.1315
whatprocessmaintenance[1-0]	-0.363406	0.259693	-1.40	0.1660
whatproductscommoncust[1-0]	0.5535001	0.289841	1.91	0.0602

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypecomponentCASE	1	1	6.4264844	5.7200	0.0194
whattypecomponentclass	1	1	3.1429766	2.7975	0.0988
whattypeenterpriseOES	1	1	1.8413814	1.6389	0.2046
whattypeenterprisescripting	1	1	2.6148756	2.3274	0.1315
whatprocessmaintenance	1	1	2.2000860	1.9582	0.1660
whatproductscommoncust	1	1	4.0972593	3.6468	0.0602

LearningCurve = 4.27 + comp-CASE(-1.56) + comp-class(-1.48) + ent-OES(-1.12) + ent-script(0.87) + proc-maint(-0.36) + prod-comcus(0.55)

Stepwise Fit - Old Survey Data - Consequences (Risk)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

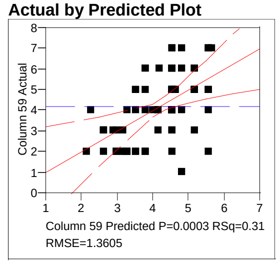
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
133.27569	72	1.8510512	0.3065	0.2391	-5.483647	56.83146

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.42730174	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.420308	0.225	0.6370
		whattypesystemsembedded{0-1}	0	1	0.714094	0.382	0.5383
	X	whattypesystemscommunications{0-1}	0.50306595	1	11.67243	6.306	0.0143
		whattypesystemsdevice{0-1}	0	1	0.707423	0.379	0.5402
		whattypeshrinkbusiness{0-1}	0	1	0.429136	0.229	0.6335
		whattypeshrinkutilities{0-1}	0	1	1.016441	0.546	0.4625
		whattypeshrinkinternet{0-1}	0	1	0.001256	0.001	0.9794
		whattypecomponentdomain{0-1}	0	1	0.056183	0.030	0.8631
		whattypecomponentCASE{0-1}	0	1	2.26576	1.228	0.2716
		whattypecomponentclass{0-1}	0	1	0.258155	0.138	0.7116
		whattypecomponentOS{0-1}	0	1	0.003651	0.002	0.9649
		whattypecomponentdevelopment{0-1}	0	1	0.937601	0.503	0.4805
		whattypeenterpriseacctng{0-1}	0	1	0.808722	0.433	0.5124
		whattypeenterprisemanufact{0-1}	0	1	1.667474	0.900	0.3461
		whattypeenterprisepayroll{0-1}	0	1	0.258155	0.138	0.7116
	X	whattypeenterpriseOES{0-1}	0.81973707	1	5.073979	2.741	0.1021
	X	whattypeenterprisescripting{0-1}	0.63294739	1	5.777588	3.121	0.0815
	X	whattypeenterpriseweb{0-1}	0.26732438	1	2.901482	1.567	0.2146
		whatprocessrequirements{0-1}	0	1	0.117853	0.063	0.8028
		whatprocessdesign{0-1}	0	1	0.567151	0.303	0.5835
		whatprocesstesting{0-1}	0	1	0.389428	0.208	0.6497
		whatprocessmaintenance{0-1}	0	1	0.001993	0.001	0.9741
		whatprocessreengineering{0-1}	0	1	0.215168	0.115	0.7357
		whatprocessappsuppt{0-1}	0	1	0.755874	0.405	0.5266
		whatprocesstraining{0-1}	0	1	1.214825	0.653	0.4217
		whatprocessspecification{0-1}	0	1	0.061565	0.033	0.8568
		whatprocessdocumentation{0-1}	0	1	1.253806	0.674	0.4143
		whatprocesscoding{0-1}	0	1	0.266222	0.142	0.7073
		whatprocessfielding{0-1}	0	1	0.01904	0.010	0.9201
	X	whatprocessCM{0-1}	0.69310296	1	23.06004	12.458	0.0007
		whatprocesstoolsuppt{0-1}	0	1	1.3125	0.706	0.4035
	X	whatprocessSWEngSuppt{0-1}	-0.3151494	1	6.071526	3.280	0.0743
		whatproductscustom{0-1}	0	1	1.992454	1.078	0.3028
	X	whatproductsCOTS{0-1}	-0.5109024	1	11.76121	6.354	0.0139
		whatproductscommoncust{0-1}	0	1	0.997793	0.536	0.4667
		whatproductsnone{0-1}	0	1	1.479037	0.797	0.3751

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsCOTS{0-1}	Entered	0.0242	12.1875	0.0634	3.0312	2
2	whatprocessCM{0-1}	Entered	0.0088	15.42722	0.1437	-1.742	3
3	whattypesystemscommunications{0-1}	Entered	0.0164	12.07871	0.2065	-5.046	4
4	whatprocessSWEngSuppt{0-1}	Entered	0.0579	7.187571	0.2439	-6.201	5
5	whattypeenterprisescripting{0-1}	Entered	0.1181	4.748486	0.2686	-6.286	6
6	whattypeenterpriseOES{0-1}	Entered	0.1297	4.380843	0.2914	-6.21	7
7	whattypeenterpriseweb{0-1}	Entered	0.2146	2.901482	0.3065	-5.484	8

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.306533
RSquare Adj	0.239113
Root Mean Square Error	1.360533
Mean of Response	4.1875
Observations (or Sum Wgts)	80

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	58.91181	8.41597	4.5466
Error	72	133.27569	1.85105	Prob > F
C. Total	79	192.18750		0.0003

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	14	24.99235	1.78517	0.9562
Pure Error	58	108.28333	1.86695	Prob > F
Total Error	72	133.27569		0.5075
				Max RSq
				0.4366

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.5174278	0.23955	18.86	<.0001
whattypesystemscommunications[1-0]	-1.006132	0.400667	-2.51	0.0143
whattypeenterpriseOES[1-0]	-1.639474	0.990238	-1.66	0.1021
whattypeenterprisescripting[1-0]	-1.265895	0.716529	-1.77	0.0815
whattypeenterpriseweb[1-0]	-0.534649	0.427039	-1.25	0.2146
whatprocessCM[1-0]	-1.386206	0.392742	-3.53	0.0007
whatprocessSWEngSuppt[1-0]	0.6302987	0.348022	1.81	0.0743
whatproductsCOTS[1-0]	1.0218048	0.40537	2.52	0.0139

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	11.672429	6.3058	0.0143
whattypeenterpriseOES	1	1	5.073979	2.7411	0.1021
whattypeenterprisescripting	1	1	5.777588	3.1212	0.0815
whattypeenterpriseweb	1	1	2.901482	1.5675	0.2146
whatprocessCM	1	1	23.060036	12.4578	0.0007
whatprocessSWEngSuppt	1	1	6.071526	3.2800	0.0743
whatproductsCOTS	1	1	11.761207	6.3538	0.0139

Risk = 4.52 + sys-comm(-1.01) + ent-OES(-1.64) + ent-script(-1.27) + ent-web(-0.53) + proc-CM(-1.39) + proc-SWEngSup(0.63) + prod-COTS(1.02)

Stepwise Fit - Old Survey Data - Consequences (Quality)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
138.55831	75	1.8474441	0.1918	0.1595	-16.09204	52.38563

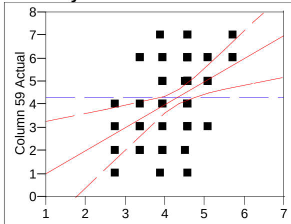
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.20996284	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.804632	0.432	0.5129
		whattypesystemsembedded{0-1}	0	1	0.072328	0.039	0.8447
		whattypesystemscommunications{0-1}	0	1	1.249862	0.674	0.4144
		whattypesystemsdevice{0-1}	0	1	0.428972	0.230	0.6331
		whattypeshrinkbusiness{0-1}	0	1	1.318692	0.711	0.4018
		whattypeshrinkutilities{0-1}	0	1	0.521273	0.279	0.5986
		whattypeshrinkinternet{0-1}	0	1	0.617671	0.331	0.5666
		whattypecomponentdomain{0-1}	0	1	0.823718	0.443	0.5080
		whattypecomponentCASE{0-1}	0	1	0.331022	0.177	0.6750
		whattypecomponentclass{0-1}	0	1	0.006299	0.003	0.9539
		whattypecomponentOS{0-1}	0	1	2.120124	1.150	0.2871
		whattypecomponentdevelopment{0-1}	0	1	0.037316	0.020	0.8881
		whattypeenterpriseacctng{0-1}	0	1	1.390717	0.750	0.3892
		whattypeenterprisemanufact{0-1}	0	1	1.228873	0.662	0.4184
		whattypeenterprisepayroll{0-1}	0	1	0.006299	0.003	0.9539
		whattypeenterpriseOES{0-1}	0	1	0.993111	0.534	0.4671
		whattypeenterprisescripting{0-1}	0	1	0.867781	0.466	0.4968
		whattypeenterpriseweb{0-1}	0	1	0.095182	0.051	0.8222
		whatprocessrequirements{0-1}	0	1	0.019064	0.010	0.9199
		whatprocessdesign{0-1}	0	1	0.046973	0.025	0.8746
		whatprocesstesting{0-1}	0	1	0.004928	0.003	0.9592
		whatprocessmaintenance{0-1}	0	1	0.30243	0.162	0.6886
	X	whatprocessreengineering{0-1}	-0.5762659	1	14.18207	7.677	0.0070
		whatprocessappsuppt{0-1}	0	1	3.399e-8	0.000	0.9999
		whatprocesstraining{0-1}	0	1	0.533073	0.286	0.5945
		whatprocessspecification{0-1}	0	1	0.240311	0.129	0.7209
		whatprocessdocumentation{0-1}	0	1	0.827112	0.444	0.5071
		whatprocesscoding{0-1}	0	1	0.202728	0.108	0.7429
		whatprocessfielding{0-1}	0	1	2.288202	1.243	0.2686
		whatprocessCM{0-1}	0	1	0.105642	0.056	0.8128
		whatprocesstoolsuppt{0-1}	0	1	1.037728	0.558	0.4573
	X	whatprocessSWEngSuppt{0-1}	0.31679381	1	6.392409	3.460	0.0668
		whatproductscustom{0-1}	0	1	0.101684	0.054	0.8163
	X	whatproductsCOTS{0-1}	0.6043975	1	17.4637	9.453	0.0029
		whatproductscommoncust{0-1}	0	1	2.188209	1.187	0.2794
		whatproductsnone{0-1}	0	1	0.414216	0.222	0.6390

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsCOTS{0-1}	Entered	0.0062	15.98366	0.0932	-13.39	2
2	whatprocessreengineering{0-1}	Entered	0.0215	10.50866	0.1545	-15.56	3
3	whatprocessSWEngSuppt{0-1}	Entered	0.0668	6.392409	0.1918	-16.09	4

Response Column 59

Actual by Predicted Plot



Column 59 Predicted P=0.0011 RSq=0.19
RMSE=1.3592

Summary of Fit

RSquare	0.191811
RSquare Adj	0.159484
Root Mean Square Error	1.359207
Mean of Response	4.329114
Observations (or Sum Wgts)	79

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	32.88473	10.9616	5.9334
Error	75	138.55831	1.8474	Prob > F
C. Total	78	171.44304		0.0011

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	4	4.63583	1.15896	0.6144
Pure Error	71	133.92247	1.88623	Prob > F
Total Error	75	138.55831		0.6536
				Max RSq
				0.2189

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.5548882	0.20017	22.76	<.0001
whatprocessreengineering[1-0]	1.1525318	0.415977	2.77	0.0070
whatprocessSWEngSuppt[1-0]	-0.633588	0.340612	-1.86	0.0668
whatproductsCOTS[1-0]	-1.208795	0.393161	-3.07	0.0029

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whatprocessreengineering	1	1	14.182067	7.6766	0.0070
whatprocessSWEngSuppt	1	1	6.392409	3.4601	0.0668
whatproductsCOTS	1	1	17.463697	9.4529	0.0029

Quality = 4.55 + proc-reeng(1.15) + proc-SWEngSup(-0.63) + prod-COTS(-1.21)

Stepwise Fit - Old Survey Data - Consequences (Rework)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

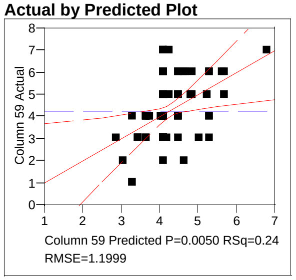
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
100.79083	70	1.439869	0.2441	0.1686	-12.48343	35.99441

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.97318561	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.038871	0.027	0.8709
		whattypesystemsembedded{0-1}	0	1	0.075269	0.052	0.8210
	X	whattypesystemscommunications{0-1}	0.21887821	1	2.219017	1.541	0.2186
	X	whattypesystemsdevice{0-1}	-0.6822697	1	7.071239	4.911	0.0299
		whattypeshrinkbusiness{0-1}	0	1	0.000786	0.001	0.9816
		whattypeshrinkutilities{0-1}	0	1	0.159745	0.110	0.7417
	X	whattypeshrinkinternet{0-1}	-0.5654568	1	5.173431	3.593	0.0622
		whattypecomponentdomain{0-1}	0	1	1.819588	1.269	0.2639
		whattypecomponentCASE{0-1}	0	1	0.344054	0.236	0.6284
		whattypecomponentclass{0-1}	0	1	0.689274	0.475	0.4930
		whattypecomponentOS{0-1}	0	1	1.363959	0.947	0.3340
		whattypecomponentdevelopment{0-1}	0	1	0.940153	0.650	0.4230
		whattypeenterpriseacctng{0-1}	0	1	0.292859	0.201	0.6553
		whattypeenterprisemanufact{0-1}	0	1	0.22654	0.155	0.6946
		whattypeenterprisepayroll{0-1}	0	1	0.689274	0.475	0.4930
		whattypeenterpriseOES{0-1}	0	1	1.213401	0.841	0.3624
	X	whattypeenterprisescripting{0-1}	0.40105105	1	2.234162	1.552	0.2170
		whattypeenterpriseweb{0-1}	0	1	0.71698	0.494	0.4844
		whatprocessrequirements{0-1}	0	1	0.01982	0.014	0.9076
		whatprocessdesign{0-1}	0	1	0.171311	0.117	0.7328
		whatprocesstesting{0-1}	0	1	0.90994	0.629	0.4306
		whatprocessmaintenance{0-1}	0	1	0.023267	0.016	0.8999
	X	whatprocessreengineering{0-1}	0.51804707	1	9.241571	6.418	0.0135
		whatprocessappsuppt{0-1}	0	1	0.000642	0.000	0.9833
		whatprocesstraining{0-1}	0	1	0.002987	0.002	0.9641
		whatprocessspecification{0-1}	0	1	0.238758	0.164	0.6869
		whatprocessdocumentation{0-1}	0	1	0.301258	0.207	0.6507
		whatprocesscoding{0-1}	0	1	1.877211	1.310	0.2564
		whatprocessfielding{0-1}	0	1	0.053837	0.037	0.8483
		whatprocessCM{0-1}	0	1	1.288677	0.894	0.3478
		whatprocesstoolsuppt{0-1}	0	1	0.283252	0.194	0.6606
	X	whatprocessSWEngSuppt{0-1}	-0.1955687	1	2.241367	1.557	0.2163
		whatproductscustom{0-1}	0	1	0.534378	0.368	0.5462
	X	whatproductsCOTS{0-1}	-0.5974604	1	16.34597	11.352	0.0012
		whatproductscommoncust{0-1}	0	1	0.19777	0.136	0.7138
		whatproductsnone{0-1}	0	1	0.010501	0.007	0.9327

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsCOTS{0-1}	Entered	0.0040	13.86679	0.1040	-15.3	2
2	whattypecomponentdomain{0-1}	Entered	0.1330	3.565351	0.1307	-15.05	3
3	whattypesystemsdevice{0-1}	Entered	0.1428	3.337927	0.1558	-14.69	4
4	whatprocessreengineering{0-1}	Entered	0.1807	2.747747	0.1764	-14.04	5
5	whattypeshrinkinternet{0-1}	Entered	0.1712	2.8385	0.1977	-13.44	6
6	whattypecomponentdomain{0-1}	Removed	0.2548	1.957808	0.1830	-14.48	5
7	whatprocessSWEngSuppt{0-1}	Entered	0.1178	3.663619	0.2104	-14.28	6
8	whattypeenterprisescripting{0-1}	Entered	0.2147	2.274184	0.2275	-13.39	7
9	whattypesystemscommunications{0-1}	Entered	0.2186	2.219017	0.2441	-12.48	8

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.244141
RSquare Adj	0.168556
Root Mean Square Error	1.199945
Mean of Response	4.269231
Observations (or Sum Wgts)	78

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	32.55532	4.65076	3.2300
Error	70	100.79083	1.43987	Prob > F
C. Total	77	133.34615		0.0050

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	13	21.29083	1.63776	1.1742
Pure Error	57	79.50000	1.39474	Prob > F
Total Error	70	100.79083		0.3214
				Max RSq
				0.4038

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.0704064	0.200654	20.29	<.0001
whattypesystemscommunications[1-0]	-0.437756	0.352626	-1.24	0.2186
whattypesystemsdevice[1-0]	1.3645393	0.615743	2.22	0.0299
whattypeshrinkinternet[1-0]	1.1309135	0.596625	1.90	0.0622
whattypeenterprisescripting[1-0]	-0.802102	0.643923	-1.25	0.2170
whatprocessreengineering[1-0]	-1.036094	0.408967	-2.53	0.0135
whatprocessSWEngSuppt[1-0]	0.3911375	0.313498	1.25	0.2163
whatproductsCOTS[1-0]	1.1949208	0.354646	3.37	0.0012

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	2.219017	1.5411	0.2186
whattypesystemsdevice	1	1	7.071239	4.9110	0.0299
whattypeshrinkinternet	1	1	5.173431	3.5930	0.0622
whattypeenterprisescripting	1	1	2.234162	1.5516	0.2170
whatprocessreengineering	1	1	9.241571	6.4183	0.0135
whatprocessSWEngSuppt	1	1	2.241367	1.5566	0.2163
whatproductsCOTS	1	1	16.345966	11.3524	0.0012

Rework = 4.07 + sys-comm(-0.44) + sys-dev(1.36) + shrink-int(1.13) + ent-script(-0.80) + proc-reeng(-1.04) + proc-SWEngSup(0.39) + prod-COTS(1.19)

Stepwise Fit - Old Survey Data - Consequences (Visibility)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
80.322548	67	1.198844	0.4229	0.3196	-0.634968	26.3219

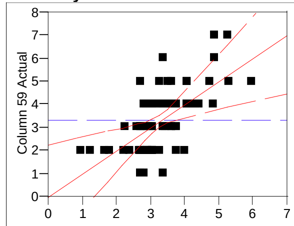
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.98677311	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.518286	0.429	0.5149
		whattypesystemsembedded{0-1}	0	1	0.602672	0.499	0.4824
	X	whattypesystemscommunications{0-1}	-0.3455468	1	5.183555	4.324	0.0414
		whattypesystemsdevice{0-1}	0	1	0.001077	0.001	0.9764
		whattypeshrinkbusiness{0-1}	0	1	0.213281	0.176	0.6764
		whattypeshrinkutilities{0-1}	0	1	0.367963	0.304	0.5834
		whattypeshrinkinternet{0-1}	0	1	0.299066	0.247	0.6211
		whattypecomponentdomain{0-1}	0	1	0.701401	0.581	0.4485
		whattypecomponentCASE{0-1}	0	1	0.438187	0.362	0.5494
		whattypecomponentclass{0-1}	0	1	0.094628	0.078	0.7811
		whattypecomponentOS{0-1}	0	1	0.852281	0.708	0.4032
	X	whattypecomponentdevelopment{0-1}	0.356298	1	4.779899	3.987	0.0499
		whattypeenterpriseacctng{0-1}	0	1	0.476471	0.394	0.5324
		whattypeenterprisemanufact{0-1}	0	1	0.151067	0.124	0.7255
		whattypeenterprisepayroll{0-1}	0	1	0.094628	0.078	0.7811
	X	whattypeenterpriseOES{0-1}	-0.9907837	1	6.935252	5.785	0.0189
	X	whattypeenterprisescripting{0-1}	-0.6244449	1	5.375618	4.484	0.0379
	X	whattypeenterpriseweb{0-1}	0.24081165	1	1.688966	1.409	0.2394
		whatprocessrequirements{0-1}	0	1	0.172193	0.142	0.7077
	X	whatprocessdesign{0-1}	0.27918704	1	3.685938	3.075	0.0841
		whatprocesstesting{0-1}	0	1	0.320998	0.265	0.6085
	X	whatprocessmaintenance{0-1}	-0.338678	1	6.758802	5.638	0.0204
	X	whatprocessreengineering{0-1}	-0.7537735	1	17.07158	14.240	0.0003
		whatprocessappsuppt{0-1}	0	1	0.50352	0.416	0.5210
		whatprocesstraining{0-1}	0	1	0.231205	0.191	0.6639
		whatprocessspecification{0-1}	0	1	0.329009	0.271	0.6041
		whatprocessdocumentation{0-1}	0	1	0.008766	0.007	0.9326
		whatprocesscoding{0-1}	0	1	0.347492	0.287	0.5941
	X	whatprocessfielding{0-1}	0.4390628	1	6.55602	5.469	0.0224
		whatprocessCM{0-1}	0	1	0.201871	0.166	0.6847
		whatprocesstoolsuppt{0-1}	0	1	0.002945	0.002	0.9609
	X	whatprocessSWEngSuppt{0-1}	0.19014744	1	2.001007	1.669	0.2008
	X	whatproductscustom{0-1}	-0.4082429	1	8.168385	6.814	0.0112
		whatproductsCOTS{0-1}	0	1	0.036239	0.030	0.8635
		whatproductscommoncust{0-1}	0	1	0.981731	0.817	0.3694
	X	whatproductsnone{0-1}	-1.2483768	1	11.04777	9.215	0.0034

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessreengineering{0-1}	Entered	0.0044	13.80005	0.0991	7.3054	2
2	whatproductsnone{0-1}	Entered	0.0324	7.280303	0.1515	4.4685	3
3	whatproductscustom{0-1}	Entered	0.0445	6.148685	0.1956	2.3834	4
4	whattypeenterpriseOES{0-1}	Entered	0.0698	4.834524	0.2304	1.1714	5
5	whatprocessfielding{0-1}	Entered	0.0563	5.179103	0.2676	-0.269	6
6	whattypeenterprisescripting{0-1}	Entered	0.0720	4.449566	0.2995	-1.226	7
7	whattypeshrinkinternet{0-1}	Entered	0.1234	3.183774	0.3224	-1.341	8
8	whattypesystemscommunications{0-1}	Entered	0.1257	3.085155	0.3446	-1.391	9
9	whatprocessmaintenance{0-1}	Entered	0.1318	2.932973	0.3657	-1.339	10
10	whattypecomponentdevelopment{0-1}	Entered	0.1419	2.737541	0.3853	-1.158	11
11	whatprocessdesign{0-1}	Entered	0.1373	2.752772	0.4051	-0.987	12
12	whattypeshrinkinternet{0-1}	Removed	0.3797	0.951842	0.3983	-2.355	11
13	whatprocessSWEngSuppt{0-1}	Entered	0.2334	1.743379	0.4108	-1.513	12
14	whattypeenterpriseweb{0-1}	Entered	0.2394	1.688966	0.4229	-0.635	13

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.422918
RSquare Adj	0.31956
Root Mean Square Error	1.094917
Mean of Response	3.3125
Observations (or Sum Wgts)	80

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	12	58.86495	4.90541	4.0918
Error	67	80.32255	1.19884	Prob > F
C. Total	79	139.18750		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	35	41.289214	1.17969	0.9671
Pure Error	32	39.033333	1.21979	Prob > F
Total Error	67	80.322548		0.5403
				Max RSq
				0.7196

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.7824335	0.321509	8.65	<.0001
whattypesystemscommunications[1-0]	0.6910937	0.332357	2.08	0.0414
whattypecomponentdevelopment[1-0]	-0.712596	0.356874	-2.00	0.0499
whattypeenterpriseOES[1-0]	1.9815674	0.823871	2.41	0.0189
whattypeenterprisescripting[1-0]	1.2488897	0.589782	2.12	0.0379
whattypeenterpriseweb[1-0]	-0.481623	0.405769	-1.19	0.2394
whatprocessdesign[1-0]	-0.558374	0.318444	-1.75	0.0841
whatprocessmaintenance[1-0]	0.677356	0.285275	2.37	0.0204
whatprocessreengineering[1-0]	1.507547	0.399499	3.77	0.0003
whatprocessfielding[1-0]	-0.878126	0.375507	-2.34	0.0224
whatprocessSWEngSuppt[1-0]	-0.380295	0.294359	-1.29	0.2008
whatproductscustom[1-0]	0.8164858	0.312796	2.61	0.0112
whatproductsnone[1-0]	2.4967535	0.822469	3.04	0.0034

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	5.183555	4.3238	0.0414
whattypecomponentdevelopment	1	1	4.779899	3.9871	0.0499
whattypeenterpriseOES	1	1	6.935252	5.7849	0.0189
whattypeenterprisescripting	1	1	5.375618	4.4840	0.0379
whattypeenterpriseweb	1	1	1.688966	1.4088	0.2394
whatprocessdesign	1	1	3.685938	3.0746	0.0841
whatprocessmaintenance	1	1	6.758802	5.6378	0.0204
whatprocessreengineering	1	1	17.071582	14.2400	0.0003
whatprocessfielding	1	1	6.556020	5.4686	0.0224
whatprocessSWEngSuppt	1	1	2.001007	1.6691	0.2008
whatproductscustom	1	1	8.168385	6.8136	0.0112
whatproductsnone	1	1	11.047775	9.2154	0.0034

Visibility = 2.78 + sys-comm(0.69) + comp-dev(-0.71) + ent-OES(1.98) + ent-script(1.25) + ent-web(-0.48) + proc-des(-0.56) + proc-maint(0.68) + proc-reeng(1.51) + roc-field(-0.88) + proc-SWEngSup(-0.38) + prod-cust(0.82) + prod-none(2.50)

Stepwise Fit - Old Survey Data - Consequences (ControlProduct)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

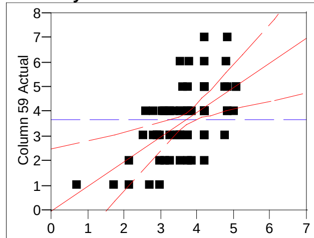
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
82.519081	69	1.1959287	0.3860	0.2970	-2.38735	24.48023

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	3.56042654	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.030868	0.025	0.8737
		whattypesystemsembedded{0-1}	0	1	0.175785	0.145	0.7044
		whattypesystemscommunications{0-1}	0	1	0.037494	0.031	0.8610
	X	whattypesystemsdevice{0-1}	0.54209815	1	4.280597	3.579	0.0627
		whattypeshrinkbusiness{0-1}	0	1	0.149815	0.124	0.7262
	X	whattypeshrinkutilities{0-1}	-0.8827025	1	4.723598	3.950	0.0508
		whattypeshrinkinternet{0-1}	0	1	0.005012	0.004	0.9489
	X	whattypecomponentdomain{0-1}	0.42847915	1	2.908912	2.432	0.1234
		whattypecomponentCASE{0-1}	0	1	0.14849	0.123	0.7273
		whattypecomponentclass{0-1}	0	1	0.001096	0.001	0.9761
		whattypecomponentOS{0-1}	0	1	0.908058	0.757	0.3875
		whattypecomponentdevelopment{0-1}	0	1	0.574318	0.477	0.4923
		whattypeenterpriseacctng{0-1}	0	1	1.540991	1.294	0.2593
		whattypeenterprisemanufact{0-1}	0	1	0.263658	0.218	0.6421
		whattypeenterprisepayroll{0-1}	0	1	0.001096	0.001	0.9761
		whattypeenterpriseOES{0-1}	0	1	0.304817	0.252	0.6172
		whattypeenterprisescripting{0-1}	0	1	0.918888	0.766	0.3846
		whattypeenterpriseweb{0-1}	0	1	0.783535	0.652	0.4223
		whatprocessrequirements{0-1}	0	1	0.79934	0.665	0.4176
		whatprocessdesign{0-1}	0	1	0.198203	0.164	0.6870
		whatprocesstesting{0-1}	0	1	0.20355	0.168	0.6830
		whatprocessmaintenance{0-1}	0	1	0.860112	0.716	0.4003
	X	whatprocessreengineering{0-1}	-0.3056548	1	2.976387	2.489	0.1192
	X	whatprocessappsuppt{0-1}	-0.9057526	1	13.38189	11.190	0.0013
		whatprocesstraining{0-1}	0	1	0.3948	0.327	0.5694
		whatprocessspecification{0-1}	0	1	0.452618	0.375	0.5423
		whatprocessdocumentation{0-1}	0	1	0.987322	0.823	0.3674
		whatprocesscoding{0-1}	0	1	0.150195	0.124	0.7258
	X	whatprocessfielding{0-1}	0.32812655	1	3.220936	2.693	0.1053
		whatprocessCM{0-1}	0	1	0.11788	0.097	0.7561
	X	whatprocesstoolsuppt{0-1}	0.3812332	1	4.993909	4.176	0.0448
	X	whatprocessSWEngSuppt{0-1}	0.2297158	1	2.205656	1.844	0.1789
		whatproductscustom{0-1}	0	1	0.413515	0.342	0.5603
	X	whatproductsCOTS{0-1}	0.4831796	1	8.525724	7.129	0.0095
	X	whatproductscommoncust{0-1}	0.33076121	1	4.96574	4.152	0.0454
		whatproductsnone{0-1}	0	1	1.388063	1.163	0.2846

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductscommoncust{0-1}	Entered	0.0056	12.6498	0.0941	6.0435	2
2	whatprocessmaintenance{0-1}	Entered	0.0329	7.033841	0.1465	3.3032	3
3	whatprocesstoolsuppt{0-1}	Entered	0.0562	5.408824	0.1867	1.658	4
4	whatprocessappsuppt{0-1}	Entered	0.0388	6.088748	0.2320	-0.445	5
5	whatproductsCOTS{0-1}	Entered	0.0661	4.635403	0.2665	-1.569	6
6	whatprocessfielding{0-1}	Entered	0.1085	3.440173	0.2921	-1.888	7
7	whattypesystemsdevice{0-1}	Entered	0.1337	2.946144	0.3140	-1.873	8
8	whatprocessSWEngSuppt{0-1}	Entered	0.1476	2.701419	0.3341	-1.694	9
9	whattypeshrinkutilities{0-1}	Entered	0.1641	2.457849	0.3524	-1.35	10
10	whattypecomponentdomain{0-1}	Entered	0.1326	2.826315	0.3735	-1.255	11
11	whatprocessmaintenance{0-1}	Removed	0.3063	1.29648	0.3638	-2.381	10
12	whatprocessreengineering{0-1}	Entered	0.1192	2.976387	0.3860	-2.387	11

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0001 RSq=0.39
RMSE=1.0936

Summary of Fit

RSquare	0.385962
RSquare Adj	0.296971
Root Mean Square Error	1.093585
Mean of Response	3.7125
Observations (or Sum Wgts)	80

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	51.86842	5.18684	4.3371
Error	69	82.51908	1.19593	Prob > F
C. Total	79	134.38750		0.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	21	30.635747	1.45885	1.3497
Pure Error	48	51.883333	1.08090	Prob > F
Total Error	69	82.519081		0.1929
				Max RSq
				0.6139

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1899103	0.180433	23.22	<.0001
whattypesystemsdevice[1-0]	-1.084196	0.573071	-1.89	0.0627
whattypeshrinkutilities[1-0]	1.765405	0.888302	1.99	0.0508
whattypecomponentdomain[1-0]	-0.856958	0.549474	-1.56	0.1234
whatprocessreengineering[1-0]	0.6113096	0.387498	1.58	0.1192
whatprocessappsuppt[1-0]	1.8115051	0.541544	3.35	0.0013
Whatprocessfielding[1-0]	-0.656253	0.399883	-1.64	0.1053
whatprocesstoolsuppt[1-0]	-0.762466	0.373124	-2.04	0.0448
whatprocessSWEngSuppt[1-0]	-0.459432	0.338302	-1.36	0.1789
whatproductsCOTS[1-0]	-0.966359	0.361931	-2.67	0.0095
whatproductscommoncust[1-0]	-0.661522	0.324642	-2.04	0.0454

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsdevice	1	1	4.280597	3.5793	0.0627
whattypeshrinkutilities	1	1	4.723598	3.9497	0.0508
whattypecomponentdomain	1	1	2.908912	2.4323	0.1234
whatprocessreengineering	1	1	2.976387	2.4888	0.1192
whatprocessappsuppt	1	1	13.381887	11.1895	0.0013
Whatprocessfielding	1	1	3.220936	2.6933	0.1053
whatprocesstoolsuppt	1	1	4.993909	4.1758	0.0448
whatprocessSWEngSuppt	1	1	2.205656	1.8443	0.1789
whatproductsCOTS	1	1	8.525724	7.1290	0.0095
whatproductscommoncust	1	1	4.965740	4.1522	0.0454

ControlProduct = 4.19 + sys-dev(-1.08) + shrink-util(1.77) + comp-domain(-0.86) + proc-reeng(0.61) + proc-appsup(1.81) + proc-field(-0.66) + proc-toolsup(-0.76) + proc-SWEngSup(-0.46) + prod-COTS(-0.97) + prod-comcust(-0.66)

Stepwise Fit - Old Survey Data - Consequences (ChangeCost)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

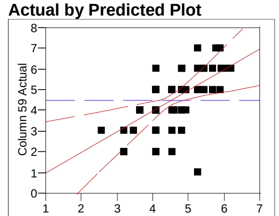
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
80.997432	69	1.1738758	0.3453	0.2599	-7.160605	21.9726

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	6.56466218	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.4290094	1	3.160353	2.692	0.1054
		whattypesystemsembedded{0-1}	0	1	0.049415	0.042	0.8392
		whattypesystemscommunications{0-1}	0	1	1.113881	0.948	0.3336
		whattypesystemsdevice{0-1}	0	1	0.030806	0.026	0.8727
		whattypeshrinkbusiness{0-1}	0	1	0.456482	0.385	0.5368
		whattypeshrinkutilities{0-1}	0	1	0.553773	0.468	0.4962
	X	whattypeshrinkinternet{0-1}	-0.6955694	1	6.987774	5.953	0.0173
		whattypecomponentdomain{0-1}	0	1	0.578532	0.489	0.4867
		whattypecomponentCASE{0-1}	0	1	0.017193	0.014	0.9047
		whattypecomponentclass{0-1}	0	1	0.167294	0.141	0.7087
	X	whattypecomponentOS{0-1}	-0.801777	1	10.96923	9.344	0.0032
		whattypecomponentdevelopment{0-1}	0	1	0.088069	0.074	0.7864
	X	whattypeenterpriseacctng{0-1}	-0.6708692	1	7.416831	6.318	0.0143
	X	whattypeenterprisemanufact{0-1}	-0.7388432	1	2.056883	1.752	0.1900
		whattypeenterprisepayroll{0-1}	0	1	0.167294	0.141	0.7087
	X	whattypeenterpriseOES{0-1}	0.98388367	1	6.844512	5.831	0.0184
		whattypeenterprisescripting{0-1}	0	1	0.467375	0.395	0.5320
	X	whattypeenterpriseweb{0-1}	0.44158039	1	5.728142	4.880	0.0305
		whatprocessrequirements{0-1}	0	1	0.020758	0.017	0.8954
		whatprocessdesign{0-1}	0	1	0.477487	0.403	0.5276
		whatprocesstesting{0-1}	0	1	0.264923	0.223	0.6382
		whatprocessmaintenance{0-1}	0	1	0.031899	0.027	0.8705
		whatprocessreengineering{0-1}	0	1	0.1531	0.129	0.7208
		whatprocessappsuppt{0-1}	0	1	0.158275	0.133	0.7163
		whatprocesstraining{0-1}	0	1	0.039953	0.034	0.8552
		whatprocessspecification{0-1}	0	1	0.013598	0.011	0.9152
		whatprocessdocumentation{0-1}	0	1	0.939663	0.798	0.3748
		whatprocesscoding{0-1}	0	1	0.011639	0.010	0.9215
		whatprocessfielding{0-1}	0	1	0.574795	0.486	0.4881
		whatprocessCM{0-1}	0	1	1.457047	1.246	0.2683
		whatprocesstoolsuppt{0-1}	0	1	0.016326	0.014	0.9071
	X	whatprocessSWEngSuppt{0-1}	-0.2254156	1	3.136669	2.672	0.1067
		whatproductscustom{0-1}	0	1	0.219892	0.185	0.6684
	X	whatproductsCOTS{0-1}	-0.3571599	1	5.603729	4.774	0.0323
		whatproductscommoncust{0-1}	0	1	0.310219	0.261	0.6108
		whatproductsnone{0-1}	0	1	0.69321	0.587	0.4462

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentOS{0-1}	Entered	0.0467	6.237735	0.0504	0.1911	2
2	whatproductsCOTS{0-1}	Entered	0.0511	5.775309	0.0971	-1.505	3
3	whattypecomponentdomain{0-1}	Entered	0.0675	4.900137	0.1367	-2.641	4
4	whattypeenterpriseacctng{0-1}	Entered	0.0577	5.108657	0.1780	-3.911	5
5	whattypeenterpriseOES{0-1}	Entered	0.0317	6.268299	0.2287	-5.923	6
6	whatprocesstoolsuppt{0-1}	Entered	0.0926	3.701944	0.2586	-6.292	7
7	whattypeenterprisemanufact{0-1}	Entered	0.2020	2.093894	0.2755	-5.632	8
8	whattypeshrinkinternet{0-1}	Entered	0.2150	1.961383	0.2914	-4.887	9
9	whattypeenterpriseweb{0-1}	Entered	0.1017	3.361312	0.3185	-5.039	10
10	whattypesystemsavionics{0-1}	Entered	0.1811	2.204849	0.3363	-4.45	11
11	whattypecomponentdomain{0-1}	Removed	0.3457	1.088921	0.3275	-5.753	10
12	whatprocessSWEngSuppt{0-1}	Entered	0.1771	2.215816	0.3455	-5.171	11
13	whatprocesstoolsuppt{0-1}	Removed	0.9071	0.016326	0.3453	-7.161	10

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0003 RSq=0.35
RMSE=1.0835

Summary of Fit

RSquare	0.345325
RSquare Adj	0.259932
Root Mean Square Error	1.083456
Mean of Response	4.518987
Observations (or Sum Wgts)	79

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	42.72409	4.74712	4.0440
Error	69	80.99743	1.17388	Prob > F
C. Total	78	123.72152		0.0003

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	9	10.049922	1.11666	0.9444
Pure Error	60	70.947510	1.18246	Prob > F
Total Error	69	80.997432		0.4943
				Max RSq
				0.4266

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.0714825	0.18409	22.12	<.0001
whattypesystemsavionics[1-0]	0.8580188	0.522926	1.64	0.1054
whattypeshrinkinternet[1-0]	1.3911389	0.57018	2.44	0.0173
whattypecomponentOS[1-0]	1.603554	0.524574	3.06	0.0032
whattypeenterpriseacctng[1-0]	1.3417385	0.533789	2.51	0.0143
whattypeenterprisemanufact[1-0]	1.4776863	1.11632	1.32	0.1900
whattypeenterpriseOES[1-0]	-1.967767	0.814917	-2.41	0.0184
whattypeenterpriseweb[1-0]	-0.883161	0.399801	-2.21	0.0305
whatprocessSWEngSuppt[1-0]	0.4508311	0.275798	1.63	0.1067
whatproductsCOTS[1-0]	0.7143198	0.326938	2.18	0.0323

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	3.160353	2.6922	0.1054
whattypeshrinkinternet	1	1	6.987774	5.9527	0.0173
whattypecomponentOS	1	1	10.969235	9.3445	0.0032
whattypeenterpriseacctng	1	1	7.416831	6.3182	0.0143
whattypeenterprisemanufact	1	1	2.056883	1.7522	0.1900
whattypeenterpriseOES	1	1	6.844512	5.8307	0.0184
whattypeenterpriseweb	1	1	5.728142	4.8797	0.0305
whatprocessSWEngSuppt	1	1	3.136669	2.6721	0.1067
whatproductsCOTS	1	1	5.603729	4.7737	0.0323

ChangeCost = 4.07 + sys-avia(0.86) + shrink-int(1.39) + comp-OS(1.60) + ent-acct(1.34) + ent-mnft(1.48) + ent-OES(-1.97) + ent-web(-0.88) + proc-SWEngSup(0.45) + prod-COTS(0.71)

Stepwise Fit - Old Survey Data - Consequences (LangCulture)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

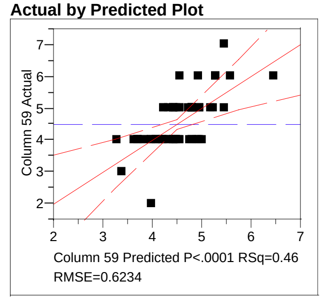
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
25.650194	66	0.3886393	0.4599	0.3698	-4.602552	-62.7483

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.13982864	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.2610471	1	1.154913	2.972	0.0894
		whattypesystemsembedded{0-1}	0	1	0.418222	1.077	0.3031
		whattypesystemscommunications{0-1}	0	1	0.187069	0.478	0.4920
		whattypesystemsdevice{0-1}	0	1	0.0602	0.153	0.6970
		whattypeshrinkbusiness{0-1}	0	1	0.046931	0.119	0.7311
	X	whattypeshrinkutilities{0-1}	-0.7499191	1	4.174295	10.741	0.0017
		whattypeshrinkinternet{0-1}	0	1	0.001682	0.004	0.9482
		whattypecomponentdomain{0-1}	0	1	0.121123	0.308	0.5806
		whattypecomponentCASE{0-1}	0	1	0.178824	0.456	0.5017
		whattypecomponentclass{0-1}	0	1	0.147903	0.377	0.5414
	X	whattypecomponentOS{0-1}	0.17512387	1	0.531482	1.368	0.2464
		whattypecomponentdevelopment{0-1}	0	1	0.431405	1.112	0.2956
	X	whattypeenterpriseacctng{0-1}	-0.4041835	1	2.636964	6.785	0.0113
		whattypeenterprisemanufact{0-1}	0	1	0.035927	0.091	0.7637
		whattypeenterprisepayroll{0-1}	0	1	0.147903	0.377	0.5414
	X	whattypeenterpriseOES{0-1}	0.30398637	1	0.622565	1.602	0.2101
		whattypeenterprisescripting{0-1}	0	1	0.149021	0.380	0.5398
		whattypeenterpriseweb{0-1}	0	1	0.245273	0.628	0.4311
	X	whatprocessrequirements{0-1}	0.22733546	1	2.097215	5.396	0.0233
	X	whatprocessdesign{0-1}	-0.3613794	1	5.826266	14.991	0.0003
		whatprocesstesting{0-1}	0	1	0.105452	0.268	0.6062
		whatprocessmaintenance{0-1}	0	1	0.276994	0.710	0.4027
		whatprocessreengineering{0-1}	0	1	0.001122	0.003	0.9576
		whatprocessappsuppt{0-1}	0	1	0.000081	0.000	0.9886
		whatprocesstraining{0-1}	0	1	0.058085	0.148	0.7022
		whatprocessspecification{0-1}	0	1	0.109741	0.279	0.5990
		whatprocessdocumentation{0-1}	0	1	0.259248	0.664	0.4182
		whatprocesscoding{0-1}	0	1	0.004854	0.012	0.9120
	X	whatprocessfielding{0-1}	0.29637258	1	2.729608	7.024	0.0101
		whatprocessCM{0-1}	0	1	0.07496	0.191	0.6639
		whatprocesstoolsuppt{0-1}	0	1	0.075144	0.191	0.6636
	X	whatprocessSWEngSuppt{0-1}	-0.2480822	1	2.71569	6.988	0.0102
	X	whatproductscustom{0-1}	0.18625596	1	1.687473	4.342	0.0411
		whatproductsCOTS{0-1}	0	1	0.013608	0.035	0.8532
	X	whatproductscommoncust{0-1}	-0.2388453	1	2.40028	6.176	0.0155
		whatproductsnone{0-1}	0	1	0.012225	0.031	0.8608

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeshrinkutilities{0-1}	Entered	0.0050	4.697706	0.0989	8.4045	2
2	whatprocessdesign{0-1}	Entered	0.0558	2.050847	0.1421	6.4549	3
3	whattypeenterpriseacctng{0-1}	Entered	0.0545	1.99847	0.1842	4.6063	4
4	whattypesystemsavionics{0-1}	Entered	0.0646	1.782643	0.2217	3.1732	5
5	whatproductscommoncust{0-1}	Entered	0.0320	2.301455	0.2702	0.741	6
6	whatprocessfielding{0-1}	Entered	0.0145	2.816809	0.3295	-2.684	7
7	whattypecomponentOS{0-1}	Entered	0.1075	1.16504	0.3541	-2.927	8
8	whatprocessrequirements{0-1}	Entered	0.1212	1.056626	0.3763	-2.962	9
9	whatprocessSWEngSuppt{0-1}	Entered	0.0414	1.770243	0.4136	-4.371	10
10	whatproductscustom{0-1}	Entered	0.0491	1.574582	0.4467	-5.404	11
11	whattypeenterpriseOES{0-1}	Entered	0.2101	0.622565	0.4599	-4.603	12

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.45985
RSquare Adj	0.369825
Root Mean Square Error	0.623409
Mean of Response	4.487179
Observations (or Sum Wgts)	78

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	21.836986	1.98518	5.1080
Error	66	25.650194	0.38864	Prob > F
C. Total	77	47.487179		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	25	14.804739	0.592190	2.2387
Pure Error	41	10.845455	0.264523	Prob > F
Total Error	66	25.650194		0.0107
				Max RSq
				0.7716

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.0654463	0.189091	21.50	<.0001
whattypesystemsavionics[1-0]	0.5220941	0.302864	1.72	0.0894
whattypeshrinkutilities[1-0]	1.4998382	0.457642	3.28	0.0017
whattypecomponentOS[1-0]	-0.350248	0.299505	-1.17	0.2464
whattypeenterpriseacctng[1-0]	0.808367	0.310334	2.60	0.0113
whattypeenterpriseOES[1-0]	-0.607973	0.480358	-1.27	0.2101
whatprocessrequirements[1-0]	-0.454671	0.195726	-2.32	0.0233
whatprocessdesign[1-0]	0.7227588	0.186669	3.87	0.0003
whatprocessfielding[1-0]	-0.592745	0.223661	-2.65	0.0101
whatprocessSWEngSuppt[1-0]	0.4961645	0.187698	2.64	0.0102
whatproductscustom[1-0]	-0.372512	0.17877	-2.08	0.0411
whatproductscommoncust[1-0]	0.4776907	0.192216	2.49	0.0155

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	1.1549131	2.9717	0.0894
whattypeshrinkutilities	1	1	4.1742952	10.7408	0.0017
whattypecomponentOS	1	1	0.5314815	1.3675	0.2464
whattypeenterpriseacctng	1	1	2.6369638	6.7851	0.0113
whattypeenterpriseOES	1	1	0.6225647	1.6019	0.2101
whatprocessrequirements	1	1	2.0972151	5.3963	0.0233
whatprocessdesign	1	1	5.8262655	14.9914	0.0003
whatprocessfielding	1	1	2.7296085	7.0235	0.0101
whatprocessSWEngSuppt	1	1	2.7156902	6.9877	0.0102
whatproductscustom	1	1	1.6874726	4.3420	0.0411
whatproductscommoncust	1	1	2.4002796	6.1761	0.0155

LangCult = 4.07 + sys-avia(0.52) + shrink-util(1.50) + comp-OS(-0.35) + ent-acct(0.81) + ent-OES(-0.61) + proc-req(-0.45) + proc-des(0.72) + proc-field(-0.59) + proc-SWEngSup(0.50) + prod-cust(-0.37) + prod-comcust(0.48)

Stepwise Fit - Old Survey Data - Consequences (TurfWar)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

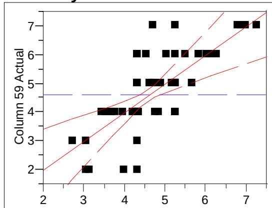
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
46.900052	63	0.7444453	0.5670	0.4776	0.5035653	-10.1756

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.53402614	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.31559089	1	1.637139	2.199	0.1431
		whattypesystemsembedded{0-1}	0	1	0.797578	1.073	0.3044
		whattypesystemscommunications{0-1}	0	1	0.384485	0.512	0.4768
	X	whattypesystemsdevice{0-1}	-0.6437914	1	5.720934	7.685	0.0073
		whattypeshrinkbusiness{0-1}	0	1	0.165339	0.219	0.6412
		whattypeshrinkutilities{0-1}	0	1	0.801746	1.078	0.3031
	X	whattypeshrinkinternet{0-1}	-0.6609301	1	4.686187	6.295	0.0147
		whattypecomponentdomain{0-1}	0	1	0.092164	0.122	0.7280
		whattypecomponentCASE{0-1}	0	1	0.240955	0.320	0.5735
	X	whattypecomponentclass{0-1}	0.41165857	1	1.085066	1.458	0.2318
	X	whattypecomponentOS{0-1}	0.38193024	1	2.359945	3.170	0.0798
		whattypecomponentdevelopment{0-1}	0	1	0.023116	0.031	0.8618
	X	whattypeenterpriseacctng{0-1}	-0.4355382	1	2.889767	3.882	0.0532
	X	whattypeenterprisemanufact{0-1}	-0.7723433	1	1.841513	2.474	0.1208
		whattypeenterprisepayroll{0-1}	0	0	0	.	.
		whattypeenterpriseOES{0-1}	0	1	0.108468	0.144	0.7059
		whattypeenterprisescripting{0-1}	0	1	0.382585	0.510	0.4779
		whattypeenterpriseweb{0-1}	0	1	0.87859	1.184	0.2808
		whatprocessrequirements{0-1}	0	1	0.471544	0.630	0.4305
		whatprocessdesign{0-1}	0	1	0.862389	1.161	0.2854
		whatprocesstesting{0-1}	0	1	0.001193	0.002	0.9685
		whatprocessmaintenance{0-1}	0	1	0.201201	0.267	0.6071
	X	whatprocessreengineering{0-1}	0.44378108	1	4.671428	6.275	0.0148
	X	whatprocessappsuppt{0-1}	0.99328021	1	14.60499	19.619	0.0000
		whatprocesstraining{0-1}	0	1	0.547117	0.732	0.3956
	X	whatprocessspecification{0-1}	0.26504064	1	2.308251	3.101	0.0831
		whatprocessdocumentation{0-1}	0	1	0.077768	0.103	0.7494
		whatprocesscoding{0-1}	0	1	0.277806	0.369	0.5455
		whatprocessfielding{0-1}	0	1	0.271972	0.362	0.5498
		whatprocessCM{0-1}	0	1	0.054212	0.072	0.7897
	X	whatprocesstoolsuppt{0-1}	-0.6037973	1	10.92175	14.671	0.0003
	X	whatprocessSWEngSuppt{0-1}	-0.4751488	1	8.936858	12.005	0.0010
		whatproductscustom{0-1}	0	1	0.407721	0.544	0.4637
	X	whatproductsCOTS{0-1}	-0.469777	1	8.933564	12.000	0.0010
		whatproductscommoncust{0-1}	0	1	0.007618	0.010	0.9204
		whatproductsnone{0-1}	0	1	0.09953	0.132	0.7178

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0134	8.543966	0.0789	32.306	2
2	whatprocessappsuppt{0-1}	Entered	0.0000	20.66413	0.2697	12.495	3
3	whatprocesstoolsuppt{0-1}	Entered	0.0145	6.260439	0.3275	7.8868	4
4	whatproductsCOTS{0-1}	Entered	0.0204	5.274857	0.3762	4.3191	5
5	whattypeenterprisemanufact{0-1}	Entered	0.0322	4.254521	0.4154	1.8284	6
6	whattypesystemsdevice{0-1}	Entered	0.0478	3.470346	0.4475	0.1655	7
7	whatprocessreengineering{0-1}	Entered	0.0873	2.500749	0.4706	-0.474	8
8	whattypeshrinkinternet{0-1}	Entered	0.1104	2.124813	0.4902	-0.717	9
9	whattypeenterpriseacctng{0-1}	Entered	0.0968	2.242833	0.5109	-1.084	10
10	whattypecomponentOS{0-1}	Entered	0.1425	1.711251	0.5267	-0.89	11
11	whatprocessspecification{0-1}	Entered	0.1361	1.735637	0.5427	-0.722	12
12	whattypesystemsavionics{0-1}	Entered	0.1563	1.543031	0.5570	-0.351	13
13	whattypecomponentclass{0-1}	Entered	0.2318	1.085066	0.5670	0.5036	14

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.57
RMSE=0.8628

Summary of Fit

RSquare	0.56699
RSquare Adj	0.477639
Root Mean Square Error	0.862812
Mean of Response	4.61039
Observations (or Sum Wgts)	77

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	13	61.41164	4.72397	6.3456
Error	63	46.90005	0.74445	Prob > F
C. Total	76	108.31169		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	23	19.284667	0.838464	1.2145
Pure Error	40	27.615385	0.690385	Prob > F
Total Error	63	46.900052		0.2883
				Max RSq
				0.7450

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.2839816	0.152293	28.13	<.0001
whattypesystemsavionics[1-0]	-0.631182	0.425626	-1.48	0.1431
whattypesystemsdevice[1-0]	1.2875828	0.46447	2.77	0.0073
whattypeshrinkinternet[1-0]	1.3218603	0.526856	2.51	0.0147
whattypecomponentclass[1-0]	-0.823317	0.681955	-1.21	0.2318
whattypecomponentOS[1-0]	-0.76386	0.429022	-1.78	0.0798
whattypeenterpriseacctng[1-0]	0.8710764	0.442121	1.97	0.0532
whattypeenterprisemanufact[1-0]	1.5446865	0.982131	1.57	0.1208
whatprocessreengineering[1-0]	-0.887562	0.354316	-2.51	0.0148
whatprocessappsuppt[1-0]	-1.98656	0.448505	-4.43	<.0001
whatprocessspecification[1-0]	-0.530081	0.301035	-1.76	0.0831
whatprocesstoolsuppt[1-0]	1.2075947	0.315276	3.83	0.0003
whatprocessSWEngSuppt[1-0]	0.9502976	0.274273	3.46	0.0010
whatproductsCOTS[1-0]	0.939554	0.271223	3.46	0.0010

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	1.637139	2.1991	0.1431
whattypesystemsdevice	1	1	5.720934	7.6848	0.0073
whattypeshrinkinternet	1	1	4.686187	6.2949	0.0147
whattypecomponentclass	1	1	1.085066	1.4575	0.2318
whattypecomponentOS	1	1	2.359945	3.1701	0.0798
whattypeenterpriseacctng	1	1	2.889767	3.8818	0.0532
whattypeenterprisemanufact	1	1	1.841513	2.4737	0.1208
whatprocessreengineering	1	1	4.671428	6.2750	0.0148
whatprocessappsuppt	1	1	14.604993	19.6186	<.0001
whatprocessspecification	1	1	2.308251	3.1006	0.0831
whatprocesstoolsuppt	1	1	10.921755	14.6710	0.0003
whatprocessSWEngSuppt	1	1	8.936858	12.0047	0.0010
whatproductsCOTS	1	1	8.933564	12.0003	0.0010

TurfWar = 4.28 + sys-avia(-0.63) + sys-dev(1.29) + shrink-int(1.32) + comp-class(-0.82) + comp-OS(-0.76) + ent-acct(0.87) + ent-mnft(1.54) + proc-reeng(-0.89) + proc-appsup(-1.99) + proc-spec(-0.53) + proc-toolsup(1.21) + proc-SWEngSup(0.95) + prod-COTS(0.94)

Stepwise Fit - Old Survey Data - Consequences (FailLikely)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

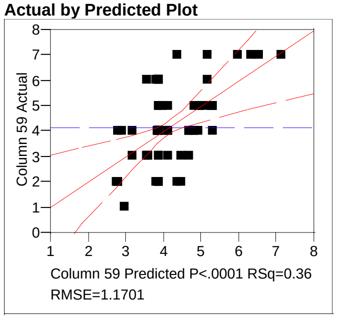
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
95.835942	70	1.3690849	0.3647	0.2921	-6.494822	33.26201

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.40906375	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.000212	0.000	0.9902
		whattypesystemsembedded{0-1}	0	1	0.576873	0.418	0.5202
		whattypesystemscommunications{0-1}	0	1	0.313122	0.226	0.6359
	X	whattypesystemsdevice{0-1}	-0.5178269	1	3.722764	2.719	0.1036
		whattypeshrinkbusiness{0-1}	0	1	0.573727	0.416	0.5213
		whattypeshrinkutilities{0-1}	0	1	0.215409	0.155	0.6946
	X	whattypeshrinkinternet{0-1}	-0.7893818	1	8.579286	6.266	0.0146
		whattypecomponentdomain{0-1}	0	1	0.3406	0.246	0.6214
		whattypecomponentCASE{0-1}	0	1	0.624582	0.453	0.5033
		whattypecomponentclass{0-1}	0	1	0.705971	0.512	0.4767
		whattypecomponentOS{0-1}	0	1	0.086229	0.062	0.8039
		whattypecomponentdevelopment{0-1}	0	1	0.782647	0.568	0.4536
		whattypeenterpriseacctng{0-1}	0	1	0.976331	0.710	0.4023
		whattypeenterprisemanufact{0-1}	0	1	0.865661	0.629	0.4305
		whattypeenterprisepayroll{0-1}	0	1	0.705971	0.512	0.4767
		whattypeenterpriseOES{0-1}	0	1	1.040914	0.758	0.3871
		whattypeenterprisescripting{0-1}	0	1	0.219048	0.158	0.6922
		whattypeenterpriseweb{0-1}	0	1	0.420508	0.304	0.5831
	X	whatprocessrequirements{0-1}	0.34959664	1	4.172481	3.048	0.0852
		whatprocessdesign{0-1}	0	1	0.14806	0.107	0.7448
		whatprocesstesting{0-1}	0	1	0.630976	0.457	0.5011
		whatprocessmaintenance{0-1}	0	1	0.638896	0.463	0.4985
	X	whatprocessreengineering{0-1}	0.44994513	1	6.723505	4.911	0.0299
		whatprocessappsuppt{0-1}	0	1	0.005849	0.004	0.9484
		whatprocesstraining{0-1}	0	1	0.764498	0.555	0.4589
		whatprocessspecification{0-1}	0	1	0.001768	0.001	0.9716
		whatprocessdocumentation{0-1}	0	1	1.125733	0.820	0.3683
		whatprocesscoding{0-1}	0	1	0.66914	0.485	0.4884
		whatprocessfielding{0-1}	0	1	1.819789	1.336	0.2518
	X	whatprocessCM{0-1}	0.54582382	1	10.29045	7.516	0.0078
	X	whatprocesstoolsuppt{0-1}	-0.711711	1	15.76179	11.513	0.0011
	X	whatprocessSWEngSuppt{0-1}	-0.4748514	1	8.622342	6.298	0.0144
		whatproductscustom{0-1}	0	1	0.677889	0.492	0.4856
	X	whatproductsCOTS{0-1}	-0.4108839	1	7.571181	5.530	0.0215
		whatproductscommoncust{0-1}	0	1	0.874191	0.635	0.4282
		whatproductsnone{0-1}	0	1	0.203204	0.147	0.7030

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocesstoolsuppt{0-1}	Entered	0.0085	13.06474	0.0866	3.3693	2
2	whatprocessCM{0-1}	Entered	0.0035	14.67609	0.1839	-2.977	3
3	whatprocessSWEngSuppt{0-1}	Entered	0.0490	6.242145	0.2253	-4.528	4
4	whatproductsCOTS{0-1}	Entered	0.1072	4.053617	0.2521	-4.833	5
5	whatprocesstraining{0-1}	Entered	0.0660	5.137712	0.2862	-5.755	6
6	whattypeshrinkinternet{0-1}	Entered	0.1502	3.073144	0.3066	-5.503	7
7	whatprocessrequirements{0-1}	Entered	0.1247	3.440048	0.3294	-5.459	8
8	whatprocessfielding{0-1}	Entered	0.1149	3.554579	0.3529	-5.481	9
9	whatprocessreengineering{0-1}	Entered	0.1793	2.536763	0.3697	-4.924	10
10	whatprocesstraining{0-1}	Removed	0.2713	1.694851	0.3585	-5.96	9
11	whattypesystemsdevice{0-1}	Entered	0.1591	2.760612	0.3768	-5.53	10
12	whatprocessfielding{0-1}	Removed	0.2518	1.819789	0.3647	-6.495	9

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.364739
RSquare Adj	0.292138
Root Mean Square Error	1.170079
Mean of Response	4.164557
Observations (or Sum Wgts)	79

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	55.02482	6.87810	5.0239
Error	70	95.83594	1.36908	Prob > F
C. Total	78	150.86076		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	17	27.390540	1.61121	1.2476
Pure Error	53	68.445402	1.29142	Prob > F
Total Error	70	95.835942		0.2628
				Max RSq
				0.5463

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.8497742	0.183944	20.93	<.0001
whattypesystemsdevice[1-0]	1.0356539	0.628054	1.65	0.1036
whattypeshrinkinternet[1-0]	1.5787637	0.630677	2.50	0.0146
whatprocessrequirements[1-0]	-0.699193	0.400512	-1.75	0.0852
whatprocessreengineering[1-0]	-0.89989	0.406076	-2.22	0.0299
whatprocessCM[1-0]	-1.091648	0.398181	-2.74	0.0078
whatprocesstoolsuppt[1-0]	1.4234221	0.419514	3.39	0.0011
whatprocessSWEngSuppt[1-0]	0.9497029	0.378434	2.51	0.0144
whatproductsCOTS[1-0]	0.8217679	0.349448	2.35	0.0215

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsdevice	1	1	3.722764	2.7192	0.1036
whattypeshrinkinternet	1	1	8.579286	6.2664	0.0146
whatprocessrequirements	1	1	4.172481	3.0476	0.0852
whatprocessreengineering	1	1	6.723505	4.9109	0.0299
whatprocessCM	1	1	10.290453	7.5163	0.0078
whatprocesstoolsuppt	1	1	15.761794	11.5126	0.0011
whatprocessSWEngSuppt	1	1	8.622342	6.2979	0.0144
whatproductsCOTS	1	1	7.571181	5.5301	0.0215

FailLikely = 3.85 + sys-dev(1.04) + shrink-int(1.58) + proc-req(-0.70) + proc-reeng(-0.90) + proc-CM(-1.09) + proc-toolsup(1.42) + proc-SWEngSup(0.95) + prod-COTS(0.82)

Stepwise Fit - Old Survey Data - Consequences (RespCust)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

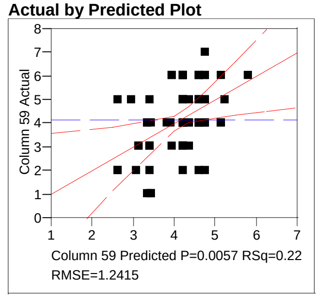
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
112.51421	73	1.5412905	0.2159	0.1514	-13.2317	41.28423

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.14377034	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.030685	0.020	0.8889
		whattypesystemsembedded{0-1}	0	1	0.03554	0.023	0.8805
		whattypesystemscommunications{0-1}	0	1	0.853077	0.550	0.4607
		whattypesystemsdevice{0-1}	0	1	0.070901	0.045	0.8319
		whattypeshrinkbusiness{0-1}	0	1	0.038755	0.025	0.8753
		whattypeshrinkutilities{0-1}	0	1	1.018881	0.658	0.4200
		whattypeshrinkinternet{0-1}	0	1	1.04921	0.678	0.4131
	X	whattypecomponentdomain{0-1}	0.43479846	1	3.385631	2.197	0.1426
		whattypecomponentCASE{0-1}	0	1	0.714462	0.460	0.4997
		whattypecomponentclass{0-1}	0	1	0.000259	0.000	0.9898
		whattypecomponentOS{0-1}	0	1	0.048652	0.031	0.8604
		whattypecomponentdevelopment{0-1}	0	1	0.198655	0.127	0.7222
		whattypeenterpriseacctng{0-1}	0	1	1.376875	0.892	0.3481
		whattypeenterprisemanufact{0-1}	0	1	0.01516	0.010	0.9218
		whattypeenterprisepayroll{0-1}	0	1	0.000259	0.000	0.9898
	X	whattypeenterpriseOES{0-1}	-0.9214312	1	6.368249	4.132	0.0457
		whattypeenterprisescripting{0-1}	0	1	1.983895	1.292	0.2594
		whattypeenterpriseweb{0-1}	0	1	0.002705	0.002	0.9669
		whatprocessrequirements{0-1}	0	1	0.686152	0.442	0.5084
		whatprocessdesign{0-1}	0	1	0.001957	0.001	0.9719
		whatprocesstesting{0-1}	0	1	1.400097	0.907	0.3440
	X	whatprocessmaintenance{0-1}	-0.1980136	1	2.151545	1.396	0.2412
		whatprocessreengineering{0-1}	0	1	0.438128	0.281	0.5974
	X	whatprocessappsuppt{0-1}	0.60987965	1	10.60416	6.880	0.0106
		whatprocesstraining{0-1}	0	1	1.05205	0.680	0.4125
		whatprocessspecification{0-1}	0	1	0.013479	0.009	0.9263
		whatprocessdocumentation{0-1}	0	1	0.130216	0.083	0.7735
		whatprocesscoding{0-1}	0	1	0.56503	0.363	0.5485
		whatprocessfielding{0-1}	0	1	0.07733	0.050	0.8245
		whatprocessCM{0-1}	0	1	0.719331	0.463	0.4983
		whatprocesstoolsuppt{0-1}	0	1	0.021224	0.014	0.9075
		whatprocessSWEngSuppt{0-1}	0	1	1.38844	0.900	0.3461
	X	whatproductscustom{0-1}	0.26185915	1	3.960955	2.570	0.1132
		whatproductsCOTS{0-1}	0	1	0.115988	0.074	0.7860
	X	whatproductscommoncust{0-1}	0.39251674	1	7.232801	4.693	0.0336
		whatproductsnone{0-1}	0	1	0.175587	0.113	0.7382

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0090	12.10431	0.0844	-14.38	2
2	whattypeenterpriseOES{0-1}	Entered	0.0957	4.680478	0.1170	-14.58	3
3	whatproductscommoncust{0-1}	Entered	0.0664	5.531956	0.1555	-15.17	4
4	whatprocessappsuppt{0-1}	Entered	0.1908	2.751942	0.1747	-14.46	5
5	whattypecomponentdomain{0-1}	Entered	0.1689	3.01066	0.1957	-13.87	6
6	whatproductscustom{0-1}	Entered	0.2292	2.27908	0.2116	-12.94	7
7	whatprocessSWEngSuppt{0-1}	Removed	0.3226	1.536676	0.2009	-14.22	6
8	whatprocessmaintenance{0-1}	Entered	0.2412	2.151545	0.2159	-13.23	7

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.215861
RSquare Adj	0.151411
Root Mean Square Error	1.241487
Mean of Response	4.1375
Observations (or Sum Wgts)	80

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	30.97329	5.16222	3.3493
Error	73	112.51421	1.54129	Prob > F
C. Total	79	143.48750		0.0057

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	10	17.23224	1.72322	1.1394
Pure Error	63	95.28196	1.51241	Prob > F
Total Error	73	112.51421		0.3483
				Max RSq
				0.3360

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.7233795	0.31459	15.01	<.0001
whattypecomponentdomain[1-0]	-0.869597	0.586733	-1.48	0.1426
whattypeenterpriseOES[1-0]	1.8428624	0.90662	2.03	0.0457
whatprocessmaintenance[1-0]	0.3960273	0.335191	1.18	0.2412
whatprocessappsuppt[1-0]	-1.219759	0.465027	-2.62	0.0106
Whatproductscustom[1-0]	-0.523718	0.326693	-1.60	0.1132
whatproductscommoncust[1-0]	-0.785033	0.362391	-2.17	0.0336

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypecomponentdomain	1	1	3.385631	2.1966	0.1426
whattypeenterpriseOES	1	1	6.368249	4.1318	0.0457
whatprocessmaintenance	1	1	2.151545	1.3959	0.2412
whatprocessappsuppt	1	1	10.604163	6.8801	0.0106
Whatproductscustom	1	1	3.960955	2.5699	0.1132
whatproductscommoncust	1	1	7.232801	4.6927	0.0336

ResponseCustomer = 4.72 + comp-domain(-0.87) + ent-OES(1.84) + proc-maint(0.40) + proc-appsup(-1.22) + prod-cust(-0.52) + prod-comcust(-0.79)

Stepwise Fit - Old Survey Data - Consequences (ResponseOrg)
Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

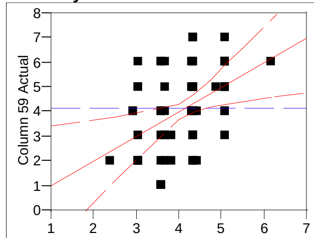
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
150.46514	75	2.0062019	0.2090	0.1563	-11.77099	62.16187

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.25908726	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.864092	0.427	0.5153
		whattypesystemsembedded{0-1}	0	1	0.204138	0.101	0.7521
		whattypesystemscommunications{0-1}	0	1	0.796818	0.394	0.5322
		whattypesystemsdevice{0-1}	0	1	1.042423	0.516	0.4747
		whattypeshrinkbusiness{0-1}	0	1	0.263623	0.130	0.7196
		whattypeshrinkutilities{0-1}	0	1	0.205052	0.101	0.7515
		whattypeshrinkinternet{0-1}	0	1	1.56774	0.779	0.3803
		whattypecomponentdomain{0-1}	0	1	1.32839	0.659	0.4195
		whattypecomponentCASE{0-1}	0	1	2.153906	1.075	0.3033
		whattypecomponentclass{0-1}	0	1	1.54323	0.767	0.3840
		whattypecomponentOS{0-1}	0	1	0.066461	0.033	0.8570
		whattypecomponentdevelopment{0-1}	0	1	2.159639	1.078	0.3026
		whattypeenterpriseacctng{0-1}	0	1	1.844384	0.918	0.3410
		whattypeenterprisemanufact{0-1}	0	1	1.153936	0.572	0.4519
		whattypeenterprisepayroll{0-1}	0	1	1.54323	0.767	0.3840
	X	whattypeenterpriseOES{0-1}	-0.912338	1	6.288016	3.134	0.0807
		whattypeenterprisescripting{0-1}	0	1	2.05496	1.025	0.3147
		whattypeenterpriseweb{0-1}	0	1	0.425712	0.210	0.6481
		whatprocessrequirements{0-1}	0	1	0.033119	0.016	0.8988
		whatprocessdesign{0-1}	0	1	0.114257	0.056	0.8132
		whatprocesstesting{0-1}	0	1	1.733468	0.862	0.3561
	X	whatprocessmaintenance{0-1}	-0.3700264	1	7.874845	3.925	0.0512
		whatprocessreengineering{0-1}	0	1	0.409686	0.202	0.6544
	X	whatprocessappsuppt{0-1}	0.63692046	1	9.852647	4.911	0.0297
		whatprocesstraining{0-1}	0	1	0.0035	0.002	0.9670
		whatprocessspecification{0-1}	0	1	0.042193	0.021	0.8858
		whatprocessdocumentation{0-1}	0	1	0.406443	0.200	0.6557
	X	whatprocesscoding{0-1}	-0.3285747	1	4.040448	2.014	0.1600
		whatprocessfielding{0-1}	0	1	1.354446	0.672	0.4149
		whatprocessCM{0-1}	0	1	1.452662	0.721	0.3984
		whatprocesstoolsuppt{0-1}	0	1	0.88543	0.438	0.5101
	X	whatprocessSWEngSuppt{0-1}	0.3835856	1	8.178324	4.077	0.0471
		whatproductscustom{0-1}	0	1	0.604958	0.299	0.5863
		whatproductsCOTS{0-1}	0	1	0.851032	0.421	0.5185
		whatproductscommoncust{0-1}	0	1	0.80964	0.400	0.5289
		whatproductsnone{0-1}	0	1	0.000017	0.000	0.9977

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessSWEngSuppt{0-1}	Entered	0.0051	18.05159	0.0949	-11.52	2
2	whatprocesscoding{0-1}	Entered	0.1157	5.411658	0.1233	-11.57	3
3	whattypeenterpriseOES{0-1}	Entered	0.1599	4.250523	0.1457	-11.19	4
4	whatprocessappsuppt{0-1}	Entered	0.1613	4.168463	0.1676	-10.78	5
5	whatprocessmaintenance{0-1}	Entered	0.0512	7.874845	0.2090	-11.77	6

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0030 RSq=0.21
RMSE=1.4164

Summary of Fit

RSquare	0.209003
RSquare Adj	0.15627
Root Mean Square Error	1.416405
Mean of Response	4.148148
Observations (or Sum Wgts)	81

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	39.75708	7.95142	3.9634
Error	75	150.46514	2.00620	Prob > F
C. Total	80	190.22222		0.0030

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	6	16.70106	2.78351	1.4358
Pure Error	69	133.76408	1.93861	Prob > F
Total Error	75	150.46514		0.2136
				Max RSq
				0.2968

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.6686542	0.444772	8.25	<.0001
whattypeenterpriseOES[1-0]	1.8246761	1.030662	1.77	0.0807
whatprocessmaintenance[1-0]	0.7400527	0.373533	1.98	0.0512
whatprocessappsuppt[1-0]	-1.273841	0.574812	-2.22	0.0297
whatprocesscoding[1-0]	0.6571494	0.463059	1.42	0.1600
whatprocessSWEngSuppt[1-0]	-0.767171	0.379968	-2.02	0.0471

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeenterpriseOES	1	1	6.2880156	3.1343	0.0807
whatprocessmaintenance	1	1	7.8748445	3.9253	0.0512
whatprocessappsuppt	1	1	9.8526472	4.9111	0.0297
whatprocesscoding	1	1	4.0404484	2.0140	0.1600
whatprocessSWEngSuppt	1	1	8.1783235	4.0765	0.0471

ResponseOrg = 3.67 + ent-OES(1.82) + proc-maint(0.74) + proc-appsup(-1.27) + proc-coding(0.66) + proc-SWEngSup(-0.77)

Appendix D - Combined Survey Data Consequence Models

Stepwise Fit - Combined Survey Data - Consequences (Cost)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

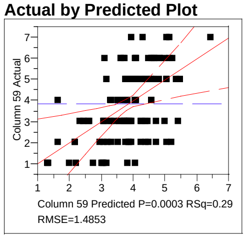
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
247.07064	112	2.2059879	0.2862	0.1970	0.7879503	114.5169

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.76944412	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	2.000107	0.906	0.3433
		whattypesystemsembedded{0-1}	0	1	1.220181	0.551	0.4595
		whattypesystemscommunications{0-1}	0	1	0.14392	0.065	0.7997
		whattypesystemsdevice{0-1}	0	1	0.222457	0.100	0.7524
	X	whattypeshrinkbusiness{0-1}	0.26900525	1	5.654029	2.563	0.1122
		whattypeshrinkutilities{0-1}	0	1	0.724546	0.326	0.5689
	X	whattypeshrinkinternet{0-1}	0.43864757	1	8.338643	3.780	0.0544
		whattypecomponentdomain{0-1}	0	1	0.014324	0.006	0.9362
	X	whattypecomponentCASE{0-1}	1.37368619	1	30.66285	13.900	0.0003
		whattypecomponentclass{0-1}	0	1	0.80781	0.364	0.5475
		whattypecomponentOS{0-1}	0	1	2.12537	0.963	0.3285
		whattypecomponentdevelopment{0-1}	0	1	0.014941	0.007	0.9348
		whattypeenterpriseacctng{0-1}	0	1	0.56201	0.253	0.6159
	X	whattypeenterprisemanufact{0-1}	-0.7585012	1	7.867534	3.566	0.0615
	X	whattypeenterprisepayroll{0-1}	0.93677846	1	17.76188	8.052	0.0054
		whattypeenterpriseOES{0-1}	0	1	0.11023	0.050	0.8243
		whattypeenterprisescripting{0-1}	0	1	1.272751	0.575	0.4500
	X	whattypeenterpriseweb{0-1}	-0.6638339	1	17.36173	7.870	0.0059
		whatprocessrequirements{0-1}	0	1	0.096404	0.043	0.8355
	X	whatprocessdesign{0-1}	-0.2663608	1	4.293094	1.946	0.1658
	X	whatprocesstesting{0-1}	0.38056655	1	10.58379	4.798	0.0306
	X	whatprocessmaintenance{0-1}	0.25611918	1	6.324151	2.867	0.0932
		whatprocessreengineering{0-1}	0	1	1.606231	0.726	0.3959
		whatprocessappsuppt{0-1}	0	1	0.132083	0.059	0.8079
		whatprocesstraining{0-1}	0	1	0.976284	0.440	0.5083
	X	whatprocessspecification{0-1}	-0.3856916	1	10.33005	4.683	0.0326
		whatprocessdocumentation{0-1}	0	1	0.539967	0.243	0.6229
		whatprocesscoding{0-1}	0	1	0.482103	0.217	0.6422
		whatprocessfielding{0-1}	0	1	1.658614	0.750	0.3883
	X	whatprocessCM{0-1}	0.38521091	1	8.603814	3.900	0.0507
		whatprocesstoolsuppt{0-1}	0	1	0.124385	0.056	0.8135
	X	whatprocessSWEngSuppt{0-1}	-0.2840337	1	6.291083	2.852	0.0941
		whatprocessnone{0-1}	0	1	0.118856	0.053	0.8176
		whatproductscustom{0-1}	0	1	0.966159	0.436	0.5105
	X	whatproductsCOTS{0-1}	-0.2081899	1	3.120533	1.415	0.2368
	X	whatproductscommoncust{0-1}	-0.2070226	1	3.270184	1.482	0.2260
		whatproductsnone{0-1}	0	1	0.045916	0.021	0.8860

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentCASE{0-1}	Entered	0.0044	21.88207	0.0632	5.3448	2
2	whattypeenterprisepayroll{0-1}	Entered	0.0119	16.17656	0.1099	0.9423	3
3	whattypeenterpriseweb{0-1}	Entered	0.0934	6.997021	0.1302	0.1729	4
4	whattypeshrinkbusiness{0-1}	Entered	0.2201	3.704105	0.1409	0.7069	5
5	whattypeshrinkinternet{0-1}	Entered	0.1426	5.258663	0.1561	0.6256	6
6	whatprocessspecification{0-1}	Entered	0.2045	3.908781	0.1673	1.0785	7
7	whatprocessCM{0-1}	Entered	0.0697	7.893483	0.1901	-0.046	8
8	whattypeenterprisemanufact{0-1}	Entered	0.1094	6.048723	0.2076	-0.44	9
9	whatprocesstesting{0-1}	Entered	0.1230	5.544293	0.2236	-0.634	10
10	whatprocessSWEngSuppt{0-1}	Entered	0.0850	6.813147	0.2433	-1.331	11
11	whatprocessmaintenance{0-1}	Entered	0.1550	4.585196	0.2566	-1.145	12
12	whatproductsCOTS{0-1}	Entered	0.2035	3.640248	0.2671	-0.586	13
13	whatprocessdesign{0-1}	Entered	0.2204	3.364367	0.2768	0.0823	14
14	whatproductscommoncust{0-1}	Entered	0.2260	3.270184	0.2862	0.788	15

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.286248
RSquare Adj	0.197029
Root Mean Square Error	1.485257
Mean of Response	3.850394
Observations (or Sum Wgts)	127

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	99.08684	7.07763	3.2084
Error	112	247.07064	2.20599	Prob > F
C. Total	126	346.15748		0.0003

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	72	201.15397	2.79381	2.4338
Pure Error	40	45.91667	1.14792	Prob > F
Total Error	112	247.07064		0.0014
				Max RSq
				0.8674

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.0358244	0.325364	12.40	<.0001
whattypeshrinkbusiness[1-0]	-0.538011	0.336057	-1.60	0.1122
whattypeshrinkinternet[1-0]	-0.877295	0.451232	-1.94	0.0544
whattypecomponentCASE[1-0]	-2.747372	0.736907	-3.73	0.0003
whattypeenterprisemanufact[1-0]	1.5170024	0.803283	1.89	0.0615
whattypeenterprisepayroll[1-0]	-1.873557	0.660274	-2.84	0.0054
whattypeenterpriseweb[1-0]	1.3276678	0.473254	2.81	0.0059
whatprocessdesign[1-0]	0.5327216	0.381871	1.40	0.1658
whatprocesstesting[1-0]	-0.761133	0.347489	-2.19	0.0306
whatprocessmaintenance[1-0]	-0.512238	0.302533	-1.69	0.0932
whatprocessspecification[1-0]	0.7713833	0.356468	2.16	0.0326
whatprocessCM[1-0]	-0.770422	0.390108	-1.97	0.0507
whatprocessSWEngSuppt[1-0]	0.5680674	0.336387	1.69	0.0941
whatproductsCOTS[1-0]	0.4163799	0.350088	1.19	0.2368
whatproductscommoncust[1-0]	0.4140452	0.340066	1.22	0.2260

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkbusiness	1	1	5.654029	2.5630	0.1122
whattypeshrinkinternet	1	1	8.338643	3.7800	0.0544
whattypecomponentCASE	1	1	30.662847	13.8998	0.0003
whattypeenterprisemanufact	1	1	7.867534	3.5664	0.0615
whattypeenterprisepayroll	1	1	17.761882	8.0517	0.0054
whattypeenterpriseweb	1	1	17.361732	7.8703	0.0059
whatprocessdesign	1	1	4.293094	1.9461	0.1658
whatprocesstesting	1	1	10.583792	4.7978	0.0306
whatprocessmaintenance	1	1	6.324151	2.8668	0.0932
whatprocessspecification	1	1	10.330046	4.6827	0.0326
whatprocessCM	1	1	8.603814	3.9002	0.0507
whatprocessSWEngSuppt	1	1	6.291083	2.8518	0.0941
whatproductsCOTS	1	1	3.120533	1.4146	0.2368
whatproductscommoncust	1	1	3.270184	1.4824	0.2260

Cost = 4.04 + (-.54)shrink-bus + (-.88)shrink-int + (-2.75)comp-case + (1.52)ent-mnft + (-1.87)ent-pay + (1.33)ent-web + (.53)proc-design + (-.76)proc-test + (-.51)proc-maint + (.77)proc-spec + (-.77)proc-cm + (.57)proc-swengsup + (.42)prod-cots + (.41)prod-comcust

Stepwise Fit - Combined Survey Data - Consequences (Sched)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
212.52433	112	1.8975386	0.3073	0.2207	-1.359694	95.38841

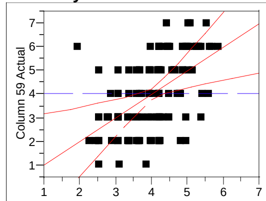
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.64369106	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.5854713	1	7.788231	4.104	0.0451
	X	whattypesystemsembedded{0-1}	-0.3376822	1	5.134244	2.706	0.1028
		whattypesystemscommunications{0-1}	0	1	0.393926	0.206	0.6507
	X	whattypesystemsdevice{0-1}	0.43635426	1	4.886104	2.575	0.1114
	X	whattypeshrinkbusiness{0-1}	-0.3042691	1	6.741254	3.553	0.0620
		whattypeshrinkutilities{0-1}	0	1	0.058719	0.031	0.8613
		whattypeshrinkinternet{0-1}	0	1	0.897267	0.471	0.4941
		whattypecomponentdomain{0-1}	0	1	0.799475	0.419	0.5187
		whattypecomponentCASE{0-1}	0	1	1.442429	0.759	0.3857
		whattypecomponentclass{0-1}	0	1	0.530359	0.278	0.5993
		whattypecomponentOS{0-1}	0	1	0.00018	0.000	0.9923
		whattypecomponentdevelopment{0-1}	0	1	1.356874	0.713	0.4002
		whattypeenterpriseacctng{0-1}	0	1	1.305325	0.686	0.4093
		whattypeenterprisemanufact{0-1}	0	1	0.000904	0.000	0.9827
	X	whattypeenterprisepayroll{0-1}	0.40849613	1	3.354843	1.768	0.1863
		whattypeenterpriseOES{0-1}	0	1	0.251672	0.132	0.7175
		whattypeenterprisescripting{0-1}	0	1	0.817272	0.429	0.5141
	X	whattypeenterpriseweb{0-1}	-0.5260352	1	10.68002	5.628	0.0194
	X	whatprocessrequirements{0-1}	0.40987844	1	10.73831	5.659	0.0191
	X	whatprocessdesign{0-1}	-0.5674255	1	22.81655	12.024	0.0007
		whatprocesstesting{0-1}	0	1	0.070548	0.037	0.8481
		whatprocessmaintenance{0-1}	0	1	0.703141	0.368	0.5451
	X	whatprocessreengineering{0-1}	-0.408045	1	9.497281	5.005	0.0273
		whatprocessappsuppt{0-1}	0	1	0.11362	0.059	0.8079
		whatprocesstraining{0-1}	0	1	0.372171	0.195	0.6599
		whatprocessspecification{0-1}	0	1	0.030108	0.016	0.9004
	X	whatprocessdocumentation{0-1}	0.27611673	1	3.002598	1.582	0.2110
		whatprocesscoding{0-1}	0	1	0.67431	0.353	0.5535
	X	whatprocessfielding{0-1}	-0.5713509	1	13.03802	6.871	0.0100
	X	whatprocessCM{0-1}	0.72374226	1	29.67625	15.639	0.0001
		whatprocesstoolsuppt{0-1}	0	1	0.113074	0.059	0.8084
	X	whatprocessSWEngSuppt{0-1}	-0.2900281	1	5.670811	2.989	0.0866
		whatprocessnone{0-1}	0	1	0.905168	0.475	0.4922
		whatproductscustom{0-1}	0	1	0.031603	0.017	0.8980
		whatproductsCOTS{0-1}	0	1	0.99783	0.524	0.4708
	X	whatproductscommoncust{0-1}	-0.2550195	1	4.647021	2.449	0.1204
		whatproductsnone{0-1}	0	1	0.285312	0.149	0.7000

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessdesign{0-1}	Entered	0.0301	11.37862	0.0371	9.9471	2
2	whatprocessCM{0-1}	Entered	0.0315	10.86486	0.0725	7.0577	3
3	whatprocessfielding{0-1}	Entered	0.0048	17.89577	0.1308	1.0042	4
4	whattypeenterpriseweb{0-1}	Entered	0.0291	10.24738	0.1642	-1.607	5
5	whattypeshrinkbusiness{0-1}	Entered	0.1177	5.155383	0.1810	-1.927	6
6	whattypesystemsavionics{0-1}	Entered	0.1151	5.167206	0.1979	-2.253	7
7	whatproductscommoncust{0-1}	Entered	0.1088	5.283874	0.2151	-2.631	8
8	whatprocessreengineering{0-1}	Entered	0.1413	4.394829	0.2294	-2.608	9
9	whatprocessrequirements{0-1}	Entered	0.0592	7.11394	0.2526	-3.81	10
10	whatprocessSWEngSuppt{0-1}	Entered	0.2083	3.121599	0.2628	-3.214	11
11	whattypesystemsembedded{0-1}	Entered	0.1655	3.767646	0.2751	-2.91	12
12	whattypesystemsdevice{0-1}	Entered	0.1765	3.551512	0.2866	-2.508	13
13	whattypeenterprisepayroll{0-1}	Entered	0.1888	3.333608	0.2975	-2.008	14
14	whatprocessdocumentation{0-1}	Entered	0.2110	3.002598	0.3073	-1.36	15

Response Column 59

Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.31
RMSE=1.3775

Summary of Fit

RSquare	0.307294
RSquare Adj	0.220706
Root Mean Square Error	1.377512
Mean of Response	4.03937
Observations (or Sum Wgts)	127

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	94.27882	6.73420	3.5489
Error	112	212.52433	1.89754	Prob > F
C. Total	126	306.80315		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	64	129.87909	2.02936	1.1786
Pure Error	48	82.64524	1.72178	Prob > F
Total Error	112	212.52433		0.2775
				Max RSq
				0.7306

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.0529519	0.293744	10.39	<.0001
whattypesystemsavionics[1-0]	1.1709425	0.577978	2.03	0.0451
whattypesystemsembedded[1-0]	0.6753645	0.410578	1.64	0.1028
whattypesystemsdevice[1-0]	-0.872709	0.543855	-1.60	0.1114
whattypeshrinkbusiness[1-0]	0.6085381	0.322859	1.88	0.0620
whattypeenterprisepayroll[1-0]	-0.816992	0.614437	-1.33	0.1863
whattypeenterpriseweb[1-0]	1.0520704	0.44346	2.37	0.0194
whatprocessrequirements[1-0]	-0.819757	0.344598	-2.38	0.0191
whatprocessdesign[1-0]	1.134851	0.327272	3.47	0.0007
whatprocessreengineering[1-0]	0.8160901	0.364782	2.24	0.0273
whatprocessdocumentation[1-0]	-0.552233	0.439005	-1.26	0.2110
whatprocessfielding[1-0]	1.1427018	0.435936	2.62	0.0100
whatprocessCM[1-0]	-1.447485	0.36602	-3.95	0.0001
whatprocessSWEngSuppt[1-0]	0.5800562	0.335539	1.73	0.0866
whatproductscommoncust[1-0]	0.5100391	0.32592	1.56	0.1204

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	7.788231	4.1044	0.0451
whattypesystemsembedded	1	1	5.134244	2.7057	0.1028
whattypesystemsdevice	1	1	4.886104	2.5750	0.1114
whattypeshrinkbusiness	1	1	6.741254	3.5526	0.0620
whattypeenterprisepayroll	1	1	3.354843	1.7680	0.1863
whattypeenterpriseweb	1	1	10.680021	5.6284	0.0194
whatprocessrequirements	1	1	10.738307	5.6591	0.0191
whatprocessdesign	1	1	22.816553	12.0243	0.0007
whatprocessreengineering	1	1	9.497281	5.0051	0.0273
whatprocessdocumentation	1	1	3.002598	1.5824	0.2110
whatprocessfielding	1	1	13.038015	6.8710	0.0100
whatprocessCM	1	1	29.676252	15.6393	0.0001
whatprocessSWEngSuppt	1	1	5.670811	2.9885	0.0866
whatproductscommoncust	1	1	4.647021	2.4490	0.1204

Sched = 3.05 + (1.17)sys-avia + (.68)sys-embed + (-.87)sys-dev + (.61)shrink-bus + (-.82)ent-pay + (1.05)ent-web + (-.82)proc-req + (1.13)proc-design + (.82)proc-reeng + (-.55)proc-doc + (1.14)proc-field + (-1.45)proc-cm + (.58)proc-swengsup + (.51)prod-comcust

Stepwise Fit - Combined Survey Data - Consequences (IntelCapital)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
94.202467	110	0.8563861	0.3778	0.2986	-1.163116	-5.35842

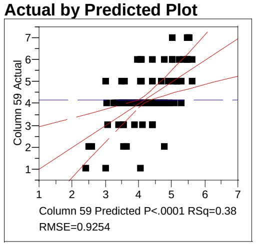
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.05178398	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.237842	0.276	0.6005
		whattypesystemsembedded{0-1}	0	1	0.733042	0.855	0.3572
		whattypesystemscommunications{0-1}	0	1	0.012341	0.014	0.9051
		whattypesystemsdevice{0-1}	0	1	0.286251	0.332	0.5655
		whattypeshrinkbusiness{0-1}	0	1	1.085852	1.271	0.2620
		whattypeshrinkutilities{0-1}	0	1	0.16679	0.193	0.6610
	X	whattypeshrinkinternet{0-1}	-0.3137522	1	4.087482	4.773	0.0310
	X	whattypecomponentdomain{0-1}	-0.5406269	1	8.089787	9.446	0.0027
		whattypecomponentCASE{0-1}	0	1	0.152044	0.176	0.6755
		whattypecomponentclass{0-1}	0	1	0.000981	0.001	0.9732
		whattypecomponentOS{0-1}	0	1	0.923137	1.079	0.3013
	X	whattypecomponentdevelopment{0-1}	0.25366082	1	4.198426	4.902	0.0289
		whattypeenterpriseacctng{0-1}	0	1	0.050445	0.058	0.8095
		whattypeenterprisemanufact{0-1}	0	1	0.031476	0.036	0.8490
		whattypeenterprisepayroll{0-1}	0	1	1.091217	1.277	0.2609
		whattypeenterpriseOES{0-1}	0	1	0.4502	0.523	0.4709
		whattypeenterprisescripting{0-1}	0	1	0.304586	0.354	0.5533
	X	whattypeenterpriseweb{0-1}	0.27963514	1	2.655465	3.101	0.0810
		whatprocessrequirements{0-1}	0	1	0.196858	0.228	0.6338
		whatprocessdesign{0-1}	0	1	0.074975	0.087	0.7688
	X	whatprocesstesting{0-1}	0.18111677	1	2.765219	3.229	0.0751
		whatprocessmaintenance{0-1}	0	1	0.143675	0.166	0.6840
	X	whatprocessreengineering{0-1}	-0.2966347	1	5.425516	6.335	0.0133
	X	whatprocessappsuppt{0-1}	-0.3369586	1	6.544399	7.642	0.0067
	X	whatprocesstraining{0-1}	-0.4060855	1	9.045147	10.562	0.0015
	X	whatprocessspecification{0-1}	0.23032763	1	3.81829	4.459	0.0370
		whatprocessdocumentation{0-1}	0	1	0.000102	0.000	0.9913
	X	whatprocesscoding{0-1}	-0.183479	1	1.911902	2.233	0.1380
	X	whatprocessfielding{0-1}	0.50022519	1	9.883859	11.541	0.0009
		whatprocessCM{0-1}	0	1	0.158983	0.184	0.6686
		whatprocesstoolsuppt{0-1}	0	1	0.173466	0.201	0.6547
		whatprocessSWEngSuppt{0-1}	0	1	0.153386	0.178	0.6741
	X	whatprocessnone{0-1}	0.51766013	1	1.923734	2.246	0.1368
		whatproductscustom{0-1}	0	1	0.136109	0.158	0.6920
	X	whatproductsCOTS{0-1}	0.27459974	1	5.020974	5.863	0.0171
	X	whatproductscommoncust{0-1}	-0.176152	1	2.31433	2.702	0.1031
		whatproductsnone{0-1}	0	1	0.02695	0.031	0.8601

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocesstraining{0-1}	Entered	0.0041	9.831898	0.0649	20.011	2
2	whatprocessfielding{0-1}	Entered	0.0029	9.967993	0.1308	12.081	3
3	whattypecomponentdomain{0-1}	Entered	0.0107	6.918704	0.1765	7.1896	4
4	whatprocessappsuppt{0-1}	Entered	0.0407	4.292872	0.2048	4.9134	5
5	whatprocesstesting{0-1}	Entered	0.0675	3.34841	0.2270	3.5779	6
6	whatprocessnone{0-1}	Entered	0.0786	3.040774	0.2470	2.549	7
7	whatproductsCOTS{0-1}	Entered	0.1037	2.56198	0.2640	1.9969	8
8	whattypecomponentdevelopment{0-1}	Entered	0.1444	2.036393	0.2774	1.9684	9
9	whatprocessreengineering{0-1}	Entered	0.1010	2.539941	0.2942	1.4384	10
10	whatprocessspecification{0-1}	Entered	0.0834	2.784603	0.3126	0.6646	11
11	whattypeshrinkinternet{0-1}	Entered	0.0843	2.720306	0.3306	-0.045	12
12	whattypeenterpriseweb{0-1}	Entered	0.0634	3.085385	0.3509	-1.119	13
13	whatproductscommoncust{0-1}	Entered	0.1181	2.148373	0.3651	-1.259	14
14	whatprocesscoding{0-1}	Entered	0.1380	1.911902	0.3778	-1.163	15

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.377758
RSquare Adj	0.298564
Root Mean Square Error	0.925411
Mean of Response	4.192
Observations (or Sum Wgts)	125

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	57.18953	4.08497	4.7700
Error	110	94.20247	0.85639	Prob > F
C. Total	124	151.39200		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	62	57.271154	0.923728	1.2006
Pure Error	48	36.931313	0.769402	Prob > F
Total Error	110	94.202467		0.2563
				Max RSq
				0.7561

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.0353203	0.221309	18.23	<.0001
whattypeshrinkinternet[1-0]	0.6275045	0.287226	2.18	0.0310
whattypecomponentdomain[1-0]	1.0812539	0.351798	3.07	0.0027
whattypecomponentdevelopment[1-0]	-0.507322	0.229126	-2.21	0.0289
whattypeenterpriseweb[1-0]	-0.55927	0.317604	-1.76	0.0810
whatprocesstesting[1-0]	-0.362234	0.201585	-1.80	0.0751
whatprocessreengineering[1-0]	0.5932694	0.235704	2.52	0.0133
whatprocessappsuppt[1-0]	0.6739173	0.243785	2.76	0.0067
whatprocesstraining[1-0]	0.8121711	0.249905	3.25	0.0015
whatprocessspecification[1-0]	-0.460655	0.218161	-2.11	0.0370
whatprocesscoding[1-0]	0.3669581	0.245594	1.49	0.1380
whatprocessfielding[1-0]	-1.00045	0.294488	-3.40	0.0009
whatprocessnone[1-0]	-1.03532	0.690776	-1.50	0.1368
whatproductsCOTS[1-0]	-0.549199	0.226815	-2.42	0.0171
whatproductscommoncust[1-0]	0.3523041	0.214309	1.64	0.1031

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkinternet	1	1	4.0874823	4.7729	0.0310
whattypecomponentdomain	1	1	8.0897873	9.4464	0.0027
whattypecomponentdevelopment	1	1	4.1984259	4.9025	0.0289
whattypeenterpriseweb	1	1	2.6554655	3.1008	0.0810
whatprocesstesting	1	1	2.7652186	3.2289	0.0751
whatprocessreengineering	1	1	5.4255160	6.3354	0.0133
whatprocessappsuppt	1	1	6.5443987	7.6419	0.0067
whatprocesstraining	1	1	9.0451466	10.5620	0.0015
whatprocessspecification	1	1	3.8182902	4.4586	0.0370
whatprocesscoding	1	1	1.9119024	2.2325	0.1380
whatprocessfielding	1	1	9.8838592	11.5414	0.0009
whatprocessnone	1	1	1.9237345	2.2463	0.1368
whatproductsCOTS	1	1	5.0209744	5.8630	0.0171
whatproductscommoncust	1	1	2.3143301	2.7024	0.1031

IntelCap = 4.04 + (.63)shrink-int + (1.08)comp-domain + (-.51)comp-dev + (-.56)ent-web + (-.36)proc-test + (.59)proc-reeng + (.67)proc-appsup + (.81)proc-train + (-.46)proc-spec + (.37)proc-coding + (-1.00)proc-field + (-1.04)proc-none + (-.55)prod-cots + (.35)prod-comcust

Stepwise Fit - Combined Survey Data - Consequences (SchedFlex)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

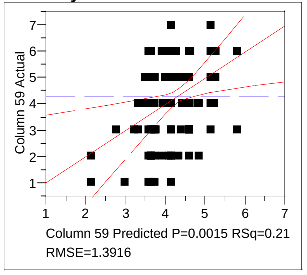
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
222.71682	115	1.936668	0.2128	0.1444	-1.768193	93.77202

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.57729711	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.50174885	1	5.921546	3.058	0.0830
	X	whattypesystemsembedded{0-1}	0.46735013	1	10.15151	5.242	0.0239
	X	whattypesystemscommunications{0-1}	-0.3280729	1	8.231976	4.251	0.0415
		whattypesystemsdevice{0-1}	0	1	0.047589	0.024	0.8762
	X	whattypeshrinkbusiness{0-1}	0.21223729	1	3.451627	1.782	0.1845
		whattypeshrinkutilities{0-1}	0	1	1.240597	0.639	0.4259
	X	whattypeshrinkinternet{0-1}	-0.2741296	1	3.595605	1.857	0.1757
	X	whattypecomponentdomain{0-1}	0.40947514	1	4.282942	2.212	0.1397
	X	whattypecomponentCASE{0-1}	0.57154378	1	5.769236	2.979	0.0870
		whattypecomponentclass{0-1}	0	1	1.676531	0.865	0.3544
	X	whattypecomponentOS{0-1}	0.33339491	1	3.06607	1.583	0.2109
		whattypecomponentdevelopment{0-1}	0	1	1.54347	0.796	0.3743
	X	whattypeenterpriseacctng{0-1}	-0.331847	1	3.833803	1.980	0.1621
		whattypeenterprisemanufact{0-1}	0	1	0.690629	0.355	0.5527
		whattypeenterprisepayroll{0-1}	0	1	0.926397	0.476	0.4916
		whattypeenterpriseOES{0-1}	0	1	2.336194	1.208	0.2739
		whattypeenterprisescripting{0-1}	0	1	1.286342	0.662	0.4175
		whattypeenterpriseweb{0-1}	0	1	0.162797	0.083	0.7733
		whatprocessrequirements{0-1}	0	1	0.419883	0.215	0.6435
		whatprocessdesign{0-1}	0	1	0.000094	0.000	0.9945
		whatprocesstesting{0-1}	0	1	1.728722	0.892	0.3470
		whatprocessmaintenance{0-1}	0	1	0.06462	0.033	0.8560
		whatprocessreengineering{0-1}	0	1	0.180816	0.093	0.7614
		whatprocessappsuppt{0-1}	0	1	0.420659	0.216	0.6432
		whatprocesstraining{0-1}	0	1	0.176785	0.091	0.7640
		whatprocessspecification{0-1}	0	1	0.692242	0.355	0.5522
		whatprocessdocumentation{0-1}	0	1	1.08393	0.558	0.4568
		whatprocesscoding{0-1}	0	1	1.009188	0.519	0.4728
	X	whatprocessfielding{0-1}	0.43332207	1	10.14757	5.240	0.0239
		whatprocessCM{0-1}	0	1	0.015701	0.008	0.9287
		whatprocesstoolsuppt{0-1}	0	1	0.310249	0.159	0.6908
		whatprocessSWEngSuppt{0-1}	0	1	0.936591	0.481	0.4892
		whatprocessnone{0-1}	0	1	0.270829	0.139	0.7102
		whatproductscustom{0-1}	0	1	0.727528	0.374	0.5423
		whatproductsCOTS{0-1}	0	1	0.004639	0.002	0.9612
		whatproductscommoncust{0-1}	0	1	0.941994	0.484	0.4879
		whatproductsnone{0-1}	0	1	2.256109	1.167	0.2824

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocesstoolsuppt{0-1}	Entered	0.0378	9.71645	0.0343	3.4102	2
2	whattypesystemsembedded{0-1}	Entered	0.0326	9.999263	0.0697	0.8204	3
3	whattypecomponentCASE{0-1}	Entered	0.0905	6.135493	0.0914	0.004	4
4	whattypesystemsavionics{0-1}	Entered	0.0907	6.032095	0.1127	-0.765	5
5	whatprocessfielding{0-1}	Entered	0.0986	5.666724	0.1327	-1.366	6
6	whatprocesstoolsuppt{0-1}	Removed	0.2944	2.267766	0.1247	-2.325	5
7	whattypeshrinkbusiness{0-1}	Entered	0.1014	5.498391	0.1441	-2.849	6
8	whattypesystemscommunications{0-1}	Entered	0.1190	4.916622	0.1615	-3.106	7
9	whattypeenterpriseacctng{0-1}	Entered	0.1172	4.904046	0.1788	-3.357	8
10	whattypecomponentdomain{0-1}	Entered	0.1716	3.696445	0.1919	-3.054	9
11	whattypeshrinkinternet{0-1}	Entered	0.2289	2.847915	0.2020	-2.361	10
12	whattypecomponentOS{0-1}	Entered	0.2109	3.06607	0.2128	-1.768	11

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.212816
RSquare Adj	0.144365
Root Mean Square Error	1.391642
Mean of Response	4.309524
Observations (or Sum Wgts)	126

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	60.21175	6.02117	3.1090
Error	115	222.71682	1.93667	Prob > F
C. Total	125	282.92857		0.0015

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	25	49.49456	1.97978	1.0286
Pure Error	90	173.22226	1.92469	Prob > F
Total Error	115	222.71682		0.4410
				Max RSq
				0.3878

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.5723198	0.20312	22.51	<.0001
whattypesystemsavionics[1-0]	-1.003498	0.573887	-1.75	0.0830
whattypesystemsembedded[1-0]	-0.9347	0.408258	-2.29	0.0239
whattypesystemscommunications[1-0]	0.6561458	0.318256	2.06	0.0415
whattypeshrinkbusiness[1-0]	-0.424475	0.317956	-1.34	0.1845
whattypeshrinkinternet[1-0]	0.5482592	0.402372	1.36	0.1757
whattypecomponentdomain[1-0]	-0.81895	0.550699	-1.49	0.1397
whattypecomponentCASE[1-0]	-1.143088	0.66229	-1.73	0.0870
whattypecomponentOS[1-0]	-0.66679	0.529939	-1.26	0.2109
whattypeenterpriseacctng[1-0]	0.6636939	0.471716	1.41	0.1621
whatprocessfielding[1-0]	-0.866644	0.378606	-2.29	0.0239

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	5.921546	3.0576	0.0830
whattypesystemsembedded	1	1	10.151508	5.2417	0.0239
whattypesystemscommunications	1	1	8.231976	4.2506	0.0415
whattypeshrinkbusiness	1	1	3.451627	1.7823	0.1845
whattypeshrinkinternet	1	1	3.595605	1.8566	0.1757
whattypecomponentdomain	1	1	4.282942	2.2115	0.1397
whattypecomponentCASE	1	1	5.769236	2.9789	0.0870
whattypecomponentOS	1	1	3.066070	1.5832	0.2109
whattypeenterpriseacctng	1	1	3.833803	1.9796	0.1621
whatprocessfielding	1	1	10.147570	5.2397	0.0239

SchedFlex = 4.57 + sys-avia(-1.00) + sys-embed(-0.93) + sys-comm (0.66) + shrink-bus(-0.42) + shrink-int(0.55) + comp-domain(-0.82) + comp-CASE(-1.14) + comp-OS(-0.67) + ent-acct(0.66) + proc-field(-0.87)

Stepwise Fit - Combined Survey Data - Consequences (AdminOverhead)
Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

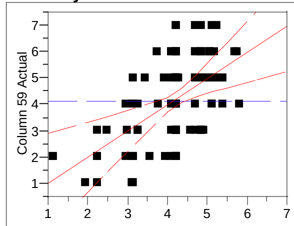
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
202.49599	115	1.7608347	0.3116	0.2517	-6.073093	81.77921

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.90816156	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.5780364	1	8.103662	4.602	0.0340
		whattypesystemsembedded{0-1}	0	1	0.101448	0.057	0.8115
		whattypesystemscommunications{0-1}	0	1	0.751293	0.425	0.5160
		whattypesystemsdevice{0-1}	0	1	0.727113	0.411	0.5228
		whattypeshrinkbusiness{0-1}	0	1	0.200264	0.113	0.7375
	X	whattypeshrinkutilities{0-1}	-0.4503626	1	3.823846	2.172	0.1433
		whattypeshrinkinternet{0-1}	0	1	1.489453	0.845	0.3600
		whattypecomponentdomain{0-1}	0	1	1.918166	1.090	0.2986
	X	whattypecomponentCASE{0-1}	0.64085321	1	7.087136	4.025	0.0472
	X	whattypecomponentclass{0-1}	0.87068312	1	13.66001	7.758	0.0063
	X	whattypecomponentOS{0-1}	0.47669297	1	6.510401	3.697	0.0570
		whattypecomponentdevelopment{0-1}	0	1	0.588073	0.332	0.5656
		whattypeenterpriseacctng{0-1}	0	1	0.011775	0.007	0.9352
		whattypeenterprisemanufact{0-1}	0	1	0.06238	0.035	0.8517
		whattypeenterprisepayroll{0-1}	0	1	0.017523	0.010	0.9211
		whattypeenterpriseOES{0-1}	0	1	0.745357	0.421	0.5177
		whattypeenterprisescripting{0-1}	0	1	0.585938	0.331	0.5663
	X	whattypeenterpriseweb{0-1}	-0.4150102	1	6.8019	3.863	0.0518
		whatprocessrequirements{0-1}	0	1	0.042485	0.024	0.8774
		whatprocessdesign{0-1}	0	1	0.003608	0.002	0.9641
		whatprocesstesting{0-1}	0	1	0.062216	0.035	0.8519
		whatprocessmaintenance{0-1}	0	1	0.026595	0.015	0.9028
		whatprocessreengineering{0-1}	0	1	0.004232	0.002	0.9612
		whatprocessappsuppt{0-1}	0	1	1.742402	0.989	0.3220
		whatprocesstraining{0-1}	0	1	0.964662	0.546	0.4616
		whatprocessspecification{0-1}	0	1	1.358536	0.770	0.3821
		whatprocessdocumentation{0-1}	0	1	0.667851	0.377	0.5403
		whatprocesscoding{0-1}	0	1	0.456539	0.258	0.6128
		whatprocessfielding{0-1}	0	1	0.377745	0.213	0.6453
	X	whatprocessCM{0-1}	0.55046902	1	16.86878	9.580	0.0025
	X	whatprocesstoolsuppt{0-1}	-0.4831141	1	11.48985	6.525	0.0119
		whatprocessSWEngSuppt{0-1}	0	1	0.630917	0.356	0.5518
		whatprocessnone{0-1}	0	1	1.478767	0.839	0.3617
		whatproductscustom{0-1}	0	1	0.017478	0.010	0.9212
		whatproductsCOTS{0-1}	0	1	0.538713	0.304	0.5824
	X	whatproductscommoncust{0-1}	-0.3110571	1	7.264591	4.126	0.0445
	X	whatproductsnone{0-1}	0.99251455	1	24.315	13.809	0.0003

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsnone{0-1}	Entered	0.0000	38.99206	0.1326	1.3869	2
2	whattypecomponentclass{0-1}	Entered	0.0401	8.62782	0.1619	-0.786	3
3	whattypecomponentOS{0-1}	Entered	0.0810	6.101291	0.1826	-1.736	4
4	whatproductscommoncust{0-1}	Entered	0.1063	5.149513	0.2001	-2.226	5
5	whattypesystemsavionics{0-1}	Entered	0.0935	5.473953	0.2188	-2.874	6
6	whatprocessCM{0-1}	Entered	0.1052	5.033623	0.2359	-3.308	7
7	whatprocesstoolsuppt{0-1}	Entered	0.0660	6.372138	0.2575	-4.389	8
8	whattypecomponentCASE{0-1}	Entered	0.0748	5.86815	0.2775	-5.227	9
9	whattypeenterpriseweb{0-1}	Entered	0.0645	6.196537	0.2986	-6.224	10
10	whattypeshrinkutilities{0-1}	Entered	0.1433	3.823846	0.3116	-6.073	11

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.31
RMSE=1.327

Summary of Fit

RSquare	0.311554
RSquare Adj	0.251689
Root Mean Square Error	1.326964
Mean of Response	4.150794
Observations (or Sum Wgts)	126

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	91.63893	9.16389	5.2043
Error	115	202.49599	1.76083	Prob > F
C. Total	125	294.13492		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	24	44.45551	1.85231	1.0666
Pure Error	91	158.04048	1.73671	Prob > F
Total Error	115	202.49599		0.3967
				Max RSq
				0.4627

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.201794	0.17116	24.55	<.0001
whattypesystemsavionics[1-0]	1.1560728	0.538895	2.15	0.0340
whattypeshrinkutilities[1-0]	0.9007251	0.611225	1.47	0.1433
whattypecomponentCASE[1-0]	-1.281706	0.63887	-2.01	0.0472
whattypecomponentclass[1-0]	-1.741366	0.625207	-2.79	0.0063
whattypecomponentOS[1-0]	-0.953386	0.49582	-1.92	0.0570
whattypeenterpriseweb[1-0]	0.8300205	0.422312	1.97	0.0518
whatprocessCM[1-0]	-1.100938	0.355697	-3.10	0.0025
whatprocesstoolsuppt[1-0]	0.9662282	0.378252	2.55	0.0119
whatproductscommoncust[1-0]	0.6221143	0.306284	2.03	0.0445
whatproductsnone[1-0]	-1.985029	0.534182	-3.72	0.0003

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	8.103662	4.6022	0.0340
whattypeshrinkutilities	1	1	3.823846	2.1716	0.1433
whattypecomponentCASE	1	1	7.087136	4.0249	0.0472
whattypecomponentclass	1	1	13.660013	7.7577	0.0063
whattypecomponentOS	1	1	6.510401	3.6973	0.0570
whattypeenterpriseweb	1	1	6.801900	3.8629	0.0518
whatprocessCM	1	1	16.868779	9.5800	0.0025
whatprocesstoolsuppt	1	1	11.489854	6.5252	0.0119
whatproductscommoncust	1	1	7.264591	4.1257	0.0445
whatproductsnone	1	1	24.315003	13.8088	0.0003

AdminOverhead = 4.20 + sys-avia(1.16) + shrink-util(0.90) + comp-CASE(-1.28) + comp-class(-1.74) + comp-OS(-0.95) + ent-web(0.83) + proc-CM(-1.10) + proc-toolsup(0.97) + prod-comcust(0.62) + prod-none(-1.99)

Stepwise Fit - Combined Survey Data - Consequences (ControlProcess)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

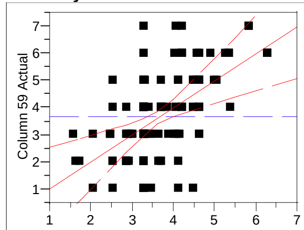
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
193.74602	114	1.6995265	0.3534	0.2911	-4.824553	78.21354

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	1.87213301	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.315133	0.184	0.6687
		whattypesystemsembedded{0-1}	0	1	0.019332	0.011	0.9156
		whattypesystemscommunications{0-1}	0	1	1.460231	0.858	0.3562
		whattypesystemsdevice{0-1}	0	1	0.004125	0.002	0.9610
		whattypeshrinkbusiness{0-1}	0	1	1.815157	1.069	0.3035
		whattypeshrinkutilities{0-1}	0	1	1.23027	0.722	0.3972
		whattypeshrinkinternet{0-1}	0	1	0.012254	0.007	0.9328
	X	whattypecomponentdomain{0-1}	0.36869086	1	3.943878	2.321	0.1304
		whattypecomponentCASE{0-1}	0	1	0.099536	0.058	0.8100
		whattypecomponentclass{0-1}	0	1	0.846624	0.496	0.4827
		whattypecomponentOS{0-1}	0	1	1.62914	0.958	0.3297
		whattypecomponentdevelopment{0-1}	0	1	0.162198	0.095	0.7589
	X	whattypeenterpriseacctng{0-1}	-0.3859681	1	5.287453	3.111	0.0804
	X	whattypeenterprisemanufact{0-1}	0.60103641	1	5.284862	3.110	0.0805
	X	whattypeenterprisepayroll{0-1}	0.85388172	1	14.99363	8.822	0.0036
		whattypeenterpriseOES{0-1}	0	1	1.561557	0.918	0.3400
		whattypeenterprisescripting{0-1}	0	1	0.057367	0.033	0.8552
		whattypeenterpriseweb{0-1}	0	1	0.03425	0.020	0.8878
		whatprocessrequirements{0-1}	0	1	0.047585	0.028	0.8680
	X	whatprocessdesign{0-1}	0.67690242	1	35.6875	20.998	0.0000
		whatprocesstesting{0-1}	0	1	1.372171	0.806	0.3712
		whatprocessmaintenance{0-1}	0	1	0.125405	0.073	0.7872
	X	whatprocessreengineering{0-1}	-0.3985334	1	11.10006	6.531	0.0119
	X	whatprocessappsuppt{0-1}	-0.4309694	1	11.6104	6.832	0.0102
		whatprocesstraining{0-1}	0	1	0.096731	0.056	0.8126
		whatprocessspecification{0-1}	0	1	0.006109	0.004	0.9525
		whatprocessdocumentation{0-1}	0	1	0.085356	0.050	0.8238
		whatprocesscoding{0-1}	0	1	0.000086	0.000	0.9944
	X	whatprocessfielding{0-1}	0.60922	1	16.95242	9.975	0.0020
	X	whatprocessCM{0-1}	-0.2144393	1	3.005997	1.769	0.1862
		whatprocesstoolsuppt{0-1}	0	1	1.294476	0.760	0.3852
		whatprocessSWEngSuppt{0-1}	0	1	0.654743	0.383	0.5372
	X	whatprocessnone{0-1}	0.84344195	1	5.176113	3.046	0.0836
	X	whatproductscustom{0-1}	-0.2085123	1	4.043738	2.379	0.1257
		whatproductsCOTS{0-1}	0	1	0.82184	0.481	0.4892
		whatproductscommoncust{0-1}	0	1	0.017826	0.010	0.9190
		whatproductsnone{0-1}	0	1	0.113113	0.066	0.7977

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessreengineering{0-1}	Entered	0.0033	20.23061	0.0675	18.15	2
2	whatprocessdesign{0-1}	Entered	0.0027	19.78295	0.1335	10.228	3
3	whattypeenterprisepayroll{0-1}	Entered	0.0217	11.01457	0.1703	6.7034	4
4	whattypeenterpriseacctng{0-1}	Entered	0.0199	10.9431	0.2068	3.2148	5
5	whatprocessfielding{0-1}	Entered	0.0362	8.565152	0.2354	0.9188	6
6	whatprocessappsuppt{0-1}	Entered	0.0094	12.679	0.2777	-3.44	7
7	whatproductscustom{0-1}	Entered	0.0537	6.750676	0.3002	-4.826	8
8	whattypeenterprisemanufact{0-1}	Entered	0.1156	4.408897	0.3149	-5.038	9
9	whatprocessnone{0-1}	Entered	0.1127	4.423842	0.3297	-5.256	10
10	whattypecomponentdomain{0-1}	Entered	0.1240	4.107921	0.3434	-5.317	11
11	whatprocessCM{0-1}	Entered	0.1862	3.005997	0.3534	-4.825	12

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.35
RMSE=1.3037

Summary of Fit

RSquare	0.353444
RSquare Adj	0.291057
Root Mean Square Error	1.303659
Mean of Response	3.674603
Observations (or Sum Wgts)	126

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	105.91271	9.62843	5.6654
Error	114	193.74602	1.69953	Prob > F
C. Total	125	299.65873		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	37	57.22221	1.54655	0.8723
Pure Error	77	136.52381	1.77304	Prob > F
Total Error	114	193.74602		0.6714
				Max RSq
				0.5444

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1868839	0.290782	14.40	<.0001
whattypecomponentdomain[1-0]	-0.737382	0.484055	-1.52	0.1304
whattypeenterpriseacctng[1-0]	0.7719362	0.437645	1.76	0.0804
whattypeenterprisemanufact[1-0]	-1.202073	0.681676	-1.76	0.0805
whattypeenterprisepayroll[1-0]	-1.707763	0.574961	-2.97	0.0036
whatprocessdesign[1-0]	-1.353805	0.295435	-4.58	<.0001
whatprocessreengineering[1-0]	0.7970667	0.311886	2.56	0.0119
whatprocessappsuppt[1-0]	0.8619389	0.329774	2.61	0.0102
whatprocessfielding[1-0]	-1.21844	0.385791	-3.16	0.0020
whatprocessCM[1-0]	0.4288786	0.322481	1.33	0.1862
whatprocessnone[1-0]	-1.686884	0.966601	-1.75	0.0836
whatproductscustom[1-0]	0.4170245	0.270355	1.54	0.1257

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypecomponentdomain	1	1	3.943878	2.3206	0.1304
whattypeenterpriseacctng	1	1	5.287453	3.1111	0.0804
whattypeenterprisemanufact	1	1	5.284862	3.1096	0.0805
whattypeenterprisepayroll	1	1	14.993628	8.8222	0.0036
whatprocessdesign	1	1	35.687500	20.9985	<.0001
whatprocessreengineering	1	1	11.100056	6.5313	0.0119
whatprocessappsuppt	1	1	11.610399	6.8315	0.0102
whatprocessfielding	1	1	16.952423	9.9748	0.0020
whatprocessCM	1	1	3.005997	1.7687	0.1862
whatprocessnone	1	1	5.176113	3.0456	0.0836
whatproductscustom	1	1	4.043738	2.3793	0.1257

ControlProcess = 4.19 + comp-domain(-0.74) + ent-acct(0.77) + ent-mnft(-1.20) + ent-pay(-1.71) + proc-des(-1.35) + proc-reeng(0.80) + proc-appsup(0.86) + proc-field(-1.22) + proc-CM(0.43) + proc-none(-1.69) + prod-cust(0.42)

Stepwise Fit - Combined Survey Data - Consequences (InhouseNonCore)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

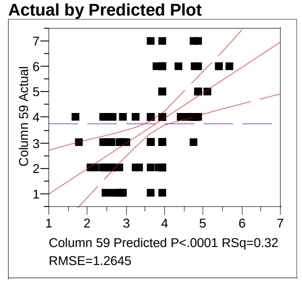
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
177.4713	111	1.5988405	0.3192	0.2517	-7.24594	69.09482

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	1.30681216	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.76636033	1	14.77664	9.242	0.0030
		whattypesystemsembedded{0-1}	0	1	0.976616	0.609	0.4370
		whattypesystemscommunications{0-1}	0	1	1.77829	1.113	0.2937
		whattypesystemsdevice{0-1}	0	1	0.035784	0.022	0.8819
		whattypeshrinkbusiness{0-1}	0	1	0.002858	0.002	0.9665
		whattypeshrinkutilities{0-1}	0	1	0.915975	0.571	0.4516
	X	whattypeshrinkinternet{0-1}	0.50519839	1	11.54484	7.221	0.0083
		whattypecomponentdomain{0-1}	0	1	0.258895	0.161	0.6893
		whattypecomponentCASE{0-1}	0	1	0.03722	0.023	0.8795
	X	whattypecomponentclass{0-1}	0.96542307	1	11.42311	7.145	0.0087
		whattypecomponentOS{0-1}	0	1	0.005453	0.003	0.9537
	X	whattypecomponentdevelopment{0-1}	-0.4635845	1	12.72151	7.957	0.0057
	X	whattypeenterpriseacctng{0-1}	-0.4036303	1	4.732332	2.960	0.0881
		whattypeenterprisemanufact{0-1}	0	1	1.071863	0.668	0.4154
	X	whattypeenterprisepayroll{0-1}	-0.5810824	1	5.15367	3.223	0.0753
	X	whattypeenterpriseOES{0-1}	0.87705647	1	5.197706	3.251	0.0741
	X	whattypeenterprisescripting{0-1}	0.64992729	1	9.174103	5.738	0.0183
	X	whattypeenterpriseweb{0-1}	-0.4279849	1	6.694961	4.187	0.0431
		whatprocessrequirements{0-1}	0	1	0.191404	0.119	0.7310
	X	whatprocessdesign{0-1}	-0.1586783	1	2.290248	1.432	0.2339
		whatprocesstesting{0-1}	0	1	0.053223	0.033	0.8562
		whatprocessmaintenance{0-1}	0	1	0.383084	0.238	0.6267
		whatprocessreengineering{0-1}	0	1	0.144334	0.090	0.7653
		whatprocessappsuppt{0-1}	0	1	0.009056	0.006	0.9404
		whatprocesstraining{0-1}	0	1	0.071521	0.044	0.8336
		whatprocessspecification{0-1}	0	1	0.841749	0.524	0.4706
		whatprocessdocumentation{0-1}	0	1	0.613843	0.382	0.5379
		whatprocesscoding{0-1}	0	1	0.045271	0.028	0.8673
		whatprocessfielding{0-1}	0	1	0.113927	0.071	0.7909
		whatprocessCM{0-1}	0	1	0.115151	0.071	0.7898
		whatprocesstoolsuppt{0-1}	0	1	0.217301	0.135	0.7142
		whatprocessSWEngSuppt{0-1}	0	1	1.230072	0.768	0.3828
		whatprocessnone{0-1}	0	1	0.611462	0.380	0.5387
		whatproductscustom{0-1}	0	1	0.871021	0.543	0.4630
		whatproductsCOTS{0-1}	0	1	0.639741	0.398	0.5295
		whatproductscommoncust{0-1}	0	1	0.14805	0.092	0.7624
	X	whatproductsnone{0-1}	0.57674319	1	7.923065	4.956	0.0280

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeenterpriseweb{0-1}	Entered	0.0067	15.43067	0.0592	7.7973	2
2	whattypesystemsavionics{0-1}	Entered	0.0398	8.525146	0.0919	5.3898	3
3	whatproductsnone{0-1}	Entered	0.0255	9.755579	0.1293	2.3461	4
4	whattypecomponentclass{0-1}	Entered	0.0467	7.513245	0.1581	0.4617	5
5	whattypeshrinkinternet{0-1}	Entered	0.0379	7.969779	0.1887	-1.659	6
6	whattypecomponentdevelopment{0-1}	Entered	0.0197	9.721023	0.2260	-4.685	7
7	whattypeenterprisescripting{0-1}	Entered	0.0132	10.53184	0.2664	-8.13	8
8	whattypeenterpriseacctng{0-1}	Entered	0.1515	3.435105	0.2796	-7.906	9
9	whattypeenterpriseOES{0-1}	Entered	0.1338	3.716006	0.2938	-7.827	10
10	whattypeenterprisepayroll{0-1}	Entered	0.1036	4.322979	0.3104	-8.062	11
11	whatprocessdesign{0-1}	Entered	0.2339	2.290248	0.3192	-7.246	12

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.319206
RSquare Adj	0.25174
Root Mean Square Error	1.264453
Mean of Response	3.756098
Observations (or Sum Wgts)	123

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	83.21163	7.56469	4.7314
Error	111	177.47130	1.59884	Prob > F
C. Total	122	260.68293		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	20	34.55701	1.72785	1.1002
Pure Error	91	142.91429	1.57049	Prob > F
Total Error	111	177.47130		0.3634
				Max RSq
				0.4518

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.6125605	0.25271	14.30	<.0001
whattypesystemsavionics[1-0]	-1.532721	0.504171	-3.04	0.0030
whattypeshrinkinternet[1-0]	-1.010397	0.376011	-2.69	0.0083
whattypecomponentclass[1-0]	-1.930846	0.722367	-2.67	0.0087
whattypecomponentdevelopment[1-0]	0.927169	0.328694	2.82	0.0057
whattypeenterpriseacctng[1-0]	0.8072607	0.469222	1.72	0.0881
whattypeenterprisepayroll[1-0]	1.1621648	0.647309	1.80	0.0753
whattypeenterpriseOES[1-0]	-1.754113	0.972869	-1.80	0.0741
whattypeenterprisescripting[1-0]	-1.299855	0.542645	-2.40	0.0183
whattypeenterpriseweb[1-0]	0.8559698	0.418299	2.05	0.0431
whatprocessdesign[1-0]	0.3173567	0.265161	1.20	0.2339
whatproductsnone[1-0]	-1.153486	0.518165	-2.23	0.0280

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	14.776638	9.2421	0.0030
whattypeshrinkinternet	1	1	11.544839	7.2208	0.0083
whattypecomponentclass	1	1	11.423112	7.1446	0.0087
whattypecomponentdevelopment	1	1	12.721511	7.9567	0.0057
whattypeenterpriseacctng	1	1	4.732332	2.9599	0.0881
whattypeenterprisepayroll	1	1	5.153670	3.2234	0.0753
whattypeenterpriseOES	1	1	5.197706	3.2509	0.0741
whattypeenterprisescripting	1	1	9.174103	5.7380	0.0183
whattypeenterpriseweb	1	1	6.694961	4.1874	0.0431
whatprocessdesign	1	1	2.290248	1.4324	0.2339
whatproductsnone	1	1	7.923065	4.9555	0.0280

InhouseNonCore = 3.61 + sys-avia(-1.53) + shrink-int(-1.01) + comp-class(-1.93) + comp-dev(0.93) + ent-acct(0.81) + ent-pay(1.16) + ent-OES(-1.75) + ent-script(-1.30) + ent-web(0.86) + proc-des(0.32) + prod-none(-1.15)

Stepwise Fit - Combined Survey Data - Consequences (InhouseTurnover)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

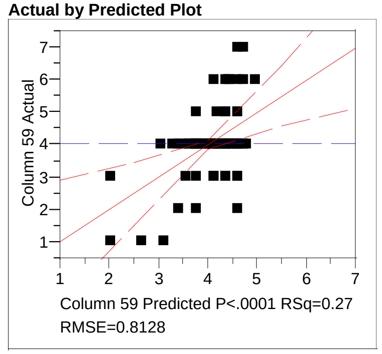
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
74.658386	113	0.6606937	0.2671	0.2152	-7.47883	-41.914

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.58039773	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.00014	0.000	0.9885
	X	whattypesystemsembedded{0-1}	-0.2095914	1	2.115388	3.202	0.0762
		whattypesystemscommunications{0-1}	0	1	0.180836	0.272	0.6031
	X	whattypesystemsdevice{0-1}	0.26185638	1	2.103914	3.184	0.0770
		whattypeshrinkbusiness{0-1}	0	1	0.000093	0.000	0.9906
		whattypeshrinkutilities{0-1}	0	1	0.128705	0.193	0.6609
		whattypeshrinkinternet{0-1}	0	1	0.01089	0.016	0.8985
		whattypecomponentdomain{0-1}	0	1	0.692642	1.049	0.3080
	X	whattypecomponentCASE{0-1}	0.2931694	1	1.597295	2.418	0.1228
		whattypecomponentclass{0-1}	0	1	0.562394	0.850	0.3585
	X	whattypecomponentOS{0-1}	0.36309644	1	3.555997	5.382	0.0221
		whattypecomponentdevelopment{0-1}	0	1	0.187154	0.281	0.5968
		whattypeenterpriseacctng{0-1}	0	1	0.294737	0.444	0.5066
		whattypeenterprisemanufact{0-1}	0	1	0.019694	0.030	0.8638
		whattypeenterprisepayroll{0-1}	0	1	0.075741	0.114	0.7366
		whattypeenterpriseOES{0-1}	0	1	0.241936	0.364	0.5474
		whattypeenterprisescripting{0-1}	0	1	0.323474	0.487	0.4865
		whattypeenterpriseweb{0-1}	0	1	0.639809	0.968	0.3273
		whatprocessrequirements{0-1}	0	1	0.080945	0.122	0.7280
		whatprocessdesign{0-1}	0	1	0.527686	0.797	0.3738
	X	whatprocesstesting{0-1}	0.18154188	1	3.329363	5.039	0.0267
		whatprocessmaintenance{0-1}	0	1	0.271989	0.410	0.5235
		whatprocessreengineering{0-1}	0	1	0.441306	0.666	0.4162
		whatprocessappsuppt{0-1}	0	1	0.044103	0.066	0.7974
		whatprocesstraining{0-1}	0	1	0.203274	0.306	0.5814
		whatprocessspecification{0-1}	0	1	0.271118	0.408	0.5242
		whatprocessdocumentation{0-1}	0	1	0.087154	0.131	0.7182
		whatprocesscoding{0-1}	0	1	0.133614	0.201	0.6549
		whatprocessfielding{0-1}	0	1	0.665279	1.007	0.3178
		whatprocessCM{0-1}	0	1	0.00029	0.000	0.9834
		whatprocesstoolsuppt{0-1}	0	1	0.476032	0.719	0.3984
	X	whatprocessSWEngSuppt{0-1}	-0.2941107	1	7.426122	11.240	0.0011
	X	whatprocessnone{0-1}	1.05340931	1	8.37996	12.684	0.0005
		whatproductscustom{0-1}	0	1	0.331963	0.500	0.4809
		whatproductsCOTS{0-1}	0	1	0.043984	0.066	0.7977
	X	whatproductscommoncust{0-1}	-0.1229504	1	1.202459	1.820	0.1800
		whatproductsnone{0-1}	0	1	0.132374	0.199	0.6564

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessnone{0-1}	Entered	0.0013	8.402186	0.0825	2.8372	2
2	whatprocessSWEngSuppt{0-1}	Entered	0.0112	4.936752	0.1309	-1.545	3
3	whattypesystemsdevice{0-1}	Entered	0.0250	3.704532	0.1673	-4.335	4
4	whatprocesstesting{0-1}	Entered	0.0585	2.567374	0.1925	-5.654	5
5	whattypecomponentOS{0-1}	Entered	0.0568	2.543933	0.2175	-6.943	6
6	whattypesystemsembedded{0-1}	Entered	0.0760	2.161457	0.2387	-7.737	7
7	whattypecomponentCASE{0-1}	Entered	0.1136	1.691773	0.2553	-7.924	8
8	whatproductscommoncust{0-1}	Entered	0.1800	1.202459	0.2671	-7.479	9

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.267113
RSquare Adj	0.215227
Root Mean Square Error	0.812831
Mean of Response	4.032787
Observations (or Sum Wgts)	122

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	27.21047	3.40131	5.1481
Error	113	74.65839	0.66069	Prob > F
C. Total	121	101.86885		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	19	24.099700	1.26841	2.3583
Pure Error	94	50.558686	0.53786	Prob > F
Total Error	113	74.658386		0.0035
				Max RSq
				0.5037

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1068186	0.14003	29.33	<.0001
whattypesystemsembedded[1-0]	0.4191828	0.234266	1.79	0.0762
whattypesystemsdevice[1-0]	-0.523713	0.29348	-1.78	0.0770
whattypecomponentCASE[1-0]	-0.586339	0.3771	-1.55	0.1228
whattypecomponentOS[1-0]	-0.726193	0.313019	-2.32	0.0221
whatprocesstesting[1-0]	-0.363084	0.161743	-2.24	0.0267
whatprocessSWEngSuppt[1-0]	0.5882214	0.175453	3.35	0.0011
whatprocessnone[1-0]	-2.106819	0.59157	-3.56	0.0005
whatproductscommoncust[1-0]	0.2459008	0.182274	1.35	0.1800

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	2.1153881	3.2018	0.0762
whattypesystemsdevice	1	1	2.1039141	3.1844	0.0770
whattypecomponentCASE	1	1	1.5972955	2.4176	0.1228
whattypecomponentOS	1	1	3.5559969	5.3822	0.0221
whatprocesstesting	1	1	3.3293628	5.0392	0.0267
whatprocessSWEngSuppt	1	1	7.4261224	11.2399	0.0011
whatprocessnone	1	1	8.3799604	12.6836	0.0005
whatproductscommoncust	1	1	1.2024595	1.8200	0.1800

InhouseTurnover = 4.11 + sys-embed(0.42) + sys-dev(-0.52) + comp-CASE(-0.59) + comp-OS(-0.73) + proc-test(-0.36) + proc-SWEngSup(0.59) + proc-none(-2.11) + prod-comcust(0.25)

Stepwise Fit - Combined Survey Data - Consequences (LearningCurve)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
144.44252	114	1.2670396	0.2920	0.2361	-6.229559	38.92241

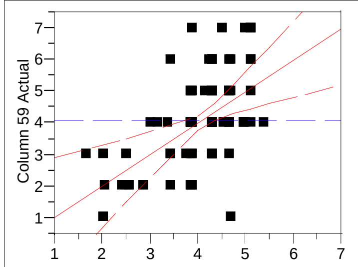
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	2.01355221	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.617392	0.485	0.4876
		whattypesystemsembedded{0-1}	0	1	0.284588	0.223	0.6376
		whattypesystemscommunications{0-1}	0	1	0.059213	0.046	0.8299
		whattypesystemsdevice{0-1}	0	1	0.047803	0.037	0.8470
		whattypeshrinkbusiness{0-1}	0	1	0.761823	0.599	0.4405
	X	whattypeshrinkutilities{0-1}	-0.3512776	1	2.31897	1.830	0.1788
		whattypeshrinkinternet{0-1}	0	1	0.777335	0.611	0.4359
		whattypecomponentdomain{0-1}	0	1	0.525151	0.412	0.5221
	X	whattypecomponentCASE{0-1}	0.89590772	1	14.84715	11.718	0.0009
	X	whattypecomponentclass{0-1}	0.46863596	1	2.815723	2.222	0.1388
		whattypecomponentOS{0-1}	0	1	0.351262	0.275	0.6007
		whattypecomponentdevelopment{0-1}	0	1	0.116196	0.091	0.7635
		whattypeenterpriseacctng{0-1}	0	1	0.280248	0.220	0.6402
		whattypeenterprisemanufact{0-1}	0	1	0.155142	0.122	0.7281
	X	whattypeenterprisepayroll{0-1}	0.6426483	1	6.569375	5.185	0.0247
		whattypeenterpriseOES{0-1}	0	1	0.947336	0.746	0.3896
	X	whattypeenterprisescripting{0-1}	-0.331167	1	2.40121	1.895	0.1713
		whattypeenterpriseweb{0-1}	0	1	0.218624	0.171	0.6798
		whatprocessrequirements{0-1}	0	1	0.000174	0.000	0.9907
		whatprocessdesign{0-1}	0	1	0.589305	0.463	0.4977
		whatprocesstesting{0-1}	0	1	1.434034	1.133	0.2894
		whatprocessmaintenance{0-1}	0	1	1.251476	0.988	0.3225
		whatprocessreengineering{0-1}	0	1	0.130633	0.102	0.7497
		whatprocessappsuppt{0-1}	0	1	0.027837	0.022	0.8829
	X	whatprocesstraining{0-1}	0.20237974	1	3.024678	2.387	0.1251
		whatprocessspecification{0-1}	0	1	0.085991	0.067	0.7958
		whatprocessdocumentation{0-1}	0	1	0.276354	0.217	0.6425
		whatprocesscoding{0-1}	0	1	0.079029	0.062	0.8040
		whatprocessfielding{0-1}	0	1	0.118675	0.093	0.7611
		whatprocessCM{0-1}	0	1	0.842109	0.663	0.4173
		whatprocesstoolsuppt{0-1}	0	1	0.078755	0.062	0.8044
		whatprocessSWEngSuppt{0-1}	0	1	0.415265	0.326	0.5693
	X	whatprocessnone{0-1}	0.9144863	1	6.219786	4.909	0.0287
	X	whatproductscustom{0-1}	-0.2248735	1	4.776427	3.770	0.0547
		whatproductsCOTS{0-1}	0	1	0.030534	0.024	0.8774
	X	whatproductscommoncust{0-1}	-0.4013195	1	12.00463	9.475	0.0026
		whatproductsnone{0-1}	0	1	0.001171	0.001	0.9759

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeenterprisepayroll{0-1}	Entered	0.0017	15.91402	0.0780	7.3283	2
2	whattypecomponentCASE{0-1}	Entered	0.0035	12.8615	0.1410	0.6226	3
3	whatprocessnone{0-1}	Entered	0.0074	10.20633	0.1911	-4.286	4
4	whatproductscommoncust{0-1}	Entered	0.0287	6.532937	0.2231	-6.708	5
5	whatproductscustom{0-1}	Entered	0.1166	3.287834	0.2392	-6.933	6
6	whattypecomponentclass{0-1}	Entered	0.0922	3.732736	0.2575	-7.46	7
7	whatprocesstraining{0-1}	Entered	0.1639	2.519874	0.2698	-7.166	8
8	whattypeenterprisescripting{0-1}	Entered	0.1911	2.207473	0.2807	-6.66	9
9	whattypeshrinkutilities{0-1}	Entered	0.1788	2.31897	0.2920	-6.23	10

Response Column 59

Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.29
RMSE=1.1256

Summary of Fit

RSquare	0.292032
RSquare Adj	0.23614
Root Mean Square Error	1.125629
Mean of Response	4.08871
Observations (or Sum Wgts)	124

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	59.58167	6.62019	5.2249
Error	114	144.44252	1.26704	Prob > F
C. Total	123	204.02419		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	17	30.53235	1.79602	1.5294
Pure Error	97	113.91017	1.17433	Prob > F
Total Error	114	144.44252		0.1004
				Max RSq
				0.4417

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.8289726	0.218912	17.49	<.0001
whattypeshrinkutilities[1-0]	0.7025552	0.519312	1.35	0.1788
whattypecomponentCASE[1-0]	-1.791815	0.52344	-3.42	0.0009
whattypecomponentclass[1-0]	-0.937272	0.628732	-1.49	0.1388
whattypeenterprisepayroll[1-0]	-1.285297	0.564464	-2.28	0.0247
whattypeenterprisescripting[1-0]	0.662334	0.481124	1.38	0.1713
whatprocesstraining[1-0]	-0.404759	0.261971	-1.55	0.1251
whatprocessnone[1-0]	-1.828973	0.825495	-2.22	0.0287
whatproductscustom[1-0]	0.4497471	0.231639	1.94	0.0547
whatproductscommoncust[1-0]	0.802639	0.26076	3.08	0.0026

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkutilities	1	1	2.318970	1.8302	0.1788
whattypecomponentCASE	1	1	14.847153	11.7180	0.0009
whattypecomponentclass	1	1	2.815723	2.2223	0.1388
whattypeenterprisepayroll	1	1	6.569375	5.1848	0.0247
whattypeenterprisescripting	1	1	2.401210	1.8951	0.1713
whatprocesstraining	1	1	3.024678	2.3872	0.1251
whatprocessnone	1	1	6.219786	4.9089	0.0287
whatproductscustom	1	1	4.776427	3.7698	0.0547
whatproductscommoncust	1	1	12.004625	9.4745	0.0026

LearningCurve = 3.83 + shrink-util(0.70) + comp-CASE(-1.79) + comp-class(-0.94) + ent-pay(-1.29) + ent-script(0.66) + proc-train(-0.40) + proc-none(-1.83) + prod-cust(0.45) + prod-comcust(0.80)

Stepwise Fit - Combined Survey Data - Consequences (Risk)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
210.83322	110	1.9166656	0.2994	0.2102	0.8635043	95.34421

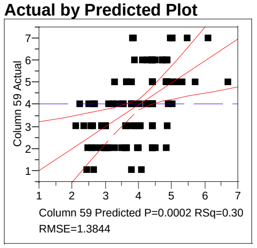
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	0.87331128	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	0.4455735	1	4.622714	2.412	0.1233
		whattypesystemsembedded{0-1}	0	1	1.109257	0.577	0.4493
	X	whattypesystemscommunications{0-1}	0.39961107	1	11.85474	6.185	0.0144
		whattypesystemsdevice{0-1}	0	1	2.018904	1.054	0.3069
		whattypeshrinkbusiness{0-1}	0	1	0.062988	0.033	0.8571
	X	whattypeshrinkutilities{0-1}	-0.8343679	1	12.01854	6.271	0.0137
		whattypeshrinkinternet{0-1}	0	1	0.00562	0.003	0.9571
		whattypecomponentdomain{0-1}	0	1	1.869075	0.975	0.3256
		whattypecomponentCASE{0-1}	0	1	1.196465	0.622	0.4320
		whattypecomponentclass{0-1}	0	1	0.008436	0.004	0.9475
	X	whattypecomponentOS{0-1}	0.5994816	1	10.08205	5.260	0.0237
	X	whattypecomponentdevelopment{0-1}	-0.2998499	1	5.700889	2.974	0.0874
		whattypeenterpriseacctng{0-1}	0	1	0.544451	0.282	0.5963
		whattypeenterprisemanufact{0-1}	0	1	0.33328	0.173	0.6786
		whattypeenterprisepayroll{0-1}	0	1	2.509847	1.313	0.2543
	X	whattypeenterpriseOES{0-1}	1.23929262	1	11.14129	5.813	0.0176
	X	whattypeenterprisescripting{0-1}	0.86899438	1	16.41125	8.562	0.0042
	X	whattypeenterpriseweb{0-1}	0.49917581	1	9.228481	4.815	0.0303
		whatprocessrequirements{0-1}	0	1	0.285006	0.148	0.7016
		whatprocessdesign{0-1}	0	1	0.003152	0.002	0.9679
		whatprocesstesting{0-1}	0	1	0.527154	0.273	0.6022
		whatprocessmaintenance{0-1}	0	1	1.807967	0.943	0.3337
	X	whatprocessreengineering{0-1}	-0.2168184	1	2.829951	1.476	0.2269
		whatprocessappsuppt{0-1}	0	1	0.089672	0.046	0.8299
	X	whatprocesstraining{0-1}	0.32223359	1	6.657614	3.474	0.0650
		whatprocessspecification{0-1}	0	1	0.026817	0.014	0.9065
	X	whatprocessdocumentation{0-1}	-0.4366682	1	8.244435	4.301	0.0404
		whatprocesscoding{0-1}	0	1	0.107028	0.055	0.8144
		whatprocessfielding{0-1}	0	1	0.002879	0.001	0.9693
	X	whatprocessCM{0-1}	0.26897488	1	4.71844	2.462	0.1195
		whatprocesstoolsuppt{0-1}	0	1	0.021683	0.011	0.9159
	X	whatprocessSWEngSuppt{0-1}	-0.1988861	1	3.108055	1.622	0.2056
		whatprocessnone{0-1}	0	1	0.058609	0.030	0.8621
		whatproductscustom{0-1}	0	1	0.080829	0.042	0.8384
		whatproductsCOTS{0-1}	0	1	1.105936	0.575	0.4500
		whatproductscommoncust{0-1}	0	1	0.786251	0.408	0.5243
	X	whatproductsnone{0-1}	0.88751286	1	18.89502	9.858	0.0022

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypeshrinkutilities{0-1}	Entered	0.0203	12.93633	0.0430	9.9466	2
2	whatproductsnone{0-1}	Entered	0.0493	9.01417	0.0729	7.8479	3
3	whattypecomponentOS{0-1}	Entered	0.0459	9.072735	0.1031	5.7227	4
4	whattypeenterprisescripting{0-1}	Entered	0.0312	10.28701	0.1373	3.0453	5
5	whattypesystemscommunications{0-1}	Entered	0.0585	7.723081	0.1629	1.5337	6
6	whattypeenterpriseOES{0-1}	Entered	0.0749	6.708421	0.1852	0.4834	7
7	whatprocessCM{0-1}	Entered	0.1256	4.889272	0.2015	0.2603	8
8	whatprocessdocumentation{0-1}	Entered	0.0869	6.02228	0.2215	-0.478	9
9	whatprocessSWEngSuppt{0-1}	Entered	0.2150	3.124689	0.2319	0.1013	10
10	whatprocesstraining{0-1}	Entered	0.1974	3.358734	0.2430	0.5741	11
11	whattypesystemsavionics{0-1}	Entered	0.1881	3.48031	0.2546	0.9917	12
12	whattypeenterpriseweb{0-1}	Entered	0.1608	3.921542	0.2676	1.2086	13
13	whattypecomponentdevelopment{0-1}	Entered	0.0642	6.726251	0.2900	0.1503	14
14	whatprocessreengineering{0-1}	Entered	0.2269	2.829951	0.2994	0.8635	15

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.29939
RSquare Adj	0.210221
Root Mean Square Error	1.384437
Mean of Response	4.024
Observations (or Sum Wgts)	125

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	90.09478	6.43534	3.3576
Error	110	210.83322	1.91667	Prob > F
C. Total	124	300.92800		0.0002

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	51	121.46941	2.38175	1.5725
Pure Error	59	89.36381	1.51464	Prob > F
Total Error	110	210.83322		0.0470
				Max RSq
				0.7030

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.4175711	0.201521	21.92	<.0001
whattypesystemsavionics[1-0]	-0.891147	0.573818	-1.55	0.1233
whattypesystemscommunications[1-0]	-0.799222	0.321362	-2.49	0.0144
whattypeshrinkutilities[1-0]	1.6687358	0.6664	2.50	0.0137
whattypecomponentOS[1-0]	-1.198963	0.522763	-2.29	0.0237
whattypecomponentdevelopment[1-0]	0.5996998	0.347725	1.72	0.0874
whattypeenterpriseOES[1-0]	-2.478585	1.028038	-2.41	0.0176
whattypeenterprisescripting[1-0]	-1.737989	0.593949	-2.93	0.0042
whattypeenterpriseweb[1-0]	-0.998352	0.454979	-2.19	0.0303
whatprocessreengineering[1-0]	0.4336368	0.35687	1.22	0.2269
whatprocesstraining[1-0]	-0.644467	0.345792	-1.86	0.0650
whatprocessdocumentation[1-0]	0.8733364	0.421089	2.07	0.0404
whatprocessCM[1-0]	-0.53795	0.342859	-1.57	0.1195
whatprocessSWEngSuppt[1-0]	0.3977722	0.312366	1.27	0.2056
whatproductsnone[1-0]	-1.775026	0.565333	-3.14	0.0022

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	4.622714	2.4119	0.1233
whattypesystemscommunications	1	1	11.854745	6.1851	0.0144
whattypeshrinkutilities	1	1	12.018542	6.2705	0.0137
whattypecomponentOS	1	1	10.082045	5.2602	0.0237
whattypecomponentdevelopment	1	1	5.700889	2.9744	0.0874
whattypeenterpriseOES	1	1	11.141294	5.8129	0.0176
whattypeenterprisescripting	1	1	16.411254	8.5624	0.0042
whattypeenterpriseweb	1	1	9.228481	4.8149	0.0303
whatprocessreengineering	1	1	2.829951	1.4765	0.2269
whatprocesstraining	1	1	6.657614	3.4735	0.0650
whatprocessdocumentation	1	1	8.244435	4.3014	0.0404
whatprocessCM	1	1	4.718440	2.4618	0.1195
whatprocessSWEngSuppt	1	1	3.108055	1.6216	0.2056
whatproductsnone	1	1	18.895017	9.8583	0.0022

Risk = 4.42 + sys-avia(-0.89) + sys-comm(-0.80) + shrinkutil(1.67) + comp-OS(-1.20) + comp-dev(0.60) + ent-OES(-2.48) + ent-script(-1.74) + ent-web(-1.00) + proc-reeng(0.43) + proc-train(-0.64) + proc-doc(0.87) + proc-CM(-0.54) + proc-SWEngSup(0.40) + prod-none(-1.78)

Stepwise Fit - Combined Survey Data - Consequences (Quality)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

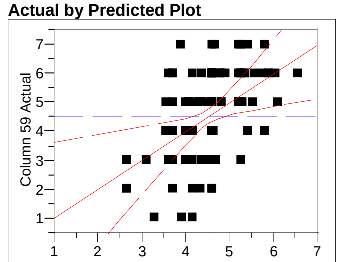
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
189.43786	113	1.6764412	0.2326	0.1647	-7.669622	74.54865

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.94560058	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.702784	0.417	0.5197
	X	whattypesystemsembedded{0-1}	0.26314942	1	3.272454	1.952	0.1651
		whattypesystemscommunications{0-1}	0	1	1.167217	0.694	0.4065
		whattypesystemsdevice{0-1}	0	1	0.424218	0.251	0.6171
		whattypeshrinkbusiness{0-1}	0	1	0.62277	0.369	0.5446
	X	whattypeshrinkutilities{0-1}	-0.3755373	1	2.466045	1.471	0.2277
	X	whattypeshrinkinternet{0-1}	-0.3354296	1	5.360056	3.197	0.0764
		whattypecomponentdomain{0-1}	0	1	1.764469	1.053	0.3070
		whattypecomponentCASE{0-1}	0	1	1.137608	0.677	0.4125
		whattypecomponentclass{0-1}	0	1	0.019883	0.012	0.9139
	X	whattypecomponentOS{0-1}	-0.5995587	1	9.896998	5.904	0.0167
		whattypecomponentdevelopment{0-1}	0	1	0.327059	0.194	0.6607
		whattypeenterpriseacctng{0-1}	0	1	1.378625	0.821	0.3668
		whattypeenterprisemanufact{0-1}	0	1	0.194249	0.115	0.7352
		whattypeenterprisepayroll{0-1}	0	1	0.24247	0.144	0.7055
	X	whattypeenterpriseOES{0-1}	-0.566412	1	2.424813	1.446	0.2316
		whattypeenterprisescripting{0-1}	0	1	0.226878	0.134	0.7147
		whattypeenterpriseweb{0-1}	0	1	1.396231	0.832	0.3638
		whatprocessrequirements{0-1}	0	1	0.003828	0.002	0.9621
		whatprocessdesign{0-1}	0	1	0.224508	0.133	0.7161
		whatprocesstesting{0-1}	0	1	0.000249	0.000	0.9903
		whatprocessmaintenance{0-1}	0	1	0.937928	0.557	0.4569
	X	whatprocessreengineering{0-1}	-0.3090394	1	6.91938	4.127	0.0445
		whatprocessappsuppt{0-1}	0	1	0.315444	0.187	0.6664
		whatprocesstraining{0-1}	0	1	0.105099	0.062	0.8036
		whatprocessspecification{0-1}	0	1	0.000012	0.000	0.9979
		whatprocessdocumentation{0-1}	0	1	0.160431	0.095	0.7586
		whatprocesscoding{0-1}	0	1	0.205294	0.122	0.7281
	X	whatprocessfielding{0-1}	0.29849357	1	4.552133	2.715	0.1022
		whatprocessCM{0-1}	0	1	0.04929	0.029	0.8647
		whatprocesstoolsuppt{0-1}	0	1	0.012637	0.007	0.9313
		whatprocessSWEngSuppt{0-1}	0	1	0.74469	0.442	0.5075
		whatprocessnone{0-1}	0	1	0.025794	0.015	0.9019
		whatproductscustom{0-1}	0	1	0.137466	0.081	0.7760
	X	whatproductsCOTS{0-1}	0.44743634	1	13.31403	7.942	0.0057
	X	whatproductscommoncust{0-1}	0.22413105	1	3.859695	2.302	0.1320
	X	whatproductsnone{0-1}	-0.4120728	1	4.314293	2.573	0.1115

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsCOTS{0-1}	Entered	0.0171	11.27763	0.0457	-2.687	2
2	whattypecomponentOS{0-1}	Entered	0.0161	11.04828	0.0904	-6.188	3
3	whatproductscommoncust{0-1}	Entered	0.0353	8.175523	0.1236	-8.259	4
4	whattypeshrinkinternet{0-1}	Entered	0.0664	6.064783	0.1481	-9.279	5
5	whatprocessreengineering{0-1}	Entered	0.0771	5.518937	0.1705	-10.03	6
6	whatproductsnone{0-1}	Entered	0.1542	3.537692	0.1848	-9.789	7
7	whatprocessfielding{0-1}	Entered	0.1357	3.842127	0.2004	-9.702	8
8	whattypesystemsembedded{0-1}	Entered	0.1840	3.020196	0.2126	-9.206	9
9	whattypeshrinkutilities{0-1}	Entered	0.2233	2.523122	0.2228	-8.462	10
10	whattypeenterpriseOES{0-1}	Entered	0.2316	2.424813	0.2326	-7.67	11

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0006 RSq=0.23
RMSE=1.2948

Summary of Fit

RSquare	0.232644
RSquare Adj	0.164737
Root Mean Square Error	1.294775
Mean of Response	4.532258
Observations (or Sum Wgts)	124

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	57.43311	5.74331	3.4259
Error	113	189.43786	1.67644	Prob > F
C. Total	123	246.87097		0.0006

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	29	58.10016	2.00345	1.2814
Pure Error	84	131.33770	1.56354	Prob > F
Total Error	113	189.43786		0.1907
				Max RSq
				0.4680

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.5807612	0.17842	25.67	<.0001
whattypesystemsembedded[1-0]	-0.526299	0.376695	-1.40	0.1651
whattypeshrinkutilities[1-0]	0.7510746	0.619265	1.21	0.2277
whattypeshrinkinternet[1-0]	0.6708591	0.375181	1.79	0.0764
whattypecomponentOS[1-0]	1.1991173	0.493519	2.43	0.0167
whattypeenterpriseOES[1-0]	1.1328241	0.941928	1.20	0.2316
whatprocessreengineering[1-0]	0.6180787	0.304232	2.03	0.0445
whatprocessfielding[1-0]	-0.596987	0.362286	-1.65	0.1022
whatproductsCOTS[1-0]	-0.894873	0.317542	-2.82	0.0057
whatproductscommoncust[1-0]	-0.448262	0.295427	-1.52	0.1320
whatproductsnone[1-0]	0.8241457	0.51374	1.60	0.1115

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	3.272454	1.9520	0.1651
whattypeshrinkutilities	1	1	2.466045	1.4710	0.2277
whattypeshrinkinternet	1	1	5.360056	3.1973	0.0764
whattypecomponentOS	1	1	9.896998	5.9036	0.0167
whattypeenterpriseOES	1	1	2.424813	1.4464	0.2316
whatprocessreengineering	1	1	6.919380	4.1274	0.0445
whatprocessfielding	1	1	4.552133	2.7154	0.1022
whatproductsCOTS	1	1	13.314025	7.9418	0.0057
whatproductscommoncust	1	1	3.859695	2.3023	0.1320
whatproductsnone	1	1	4.314293	2.5735	0.1115

Quality = 4.58 + sys-embed(-0.53) + shrink-util(0.75) + shrink-int(0.67) + comp-OS(1.20) + ent-OES(1.13) + proc-reeng(0.62) +proc-field(-0.60) + prod-COTS(-0.89) + prod-comcust(-0.45) + prod-none(0.82)

Stepwise Fit - Combined Survey Data - Consequences (Rework)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

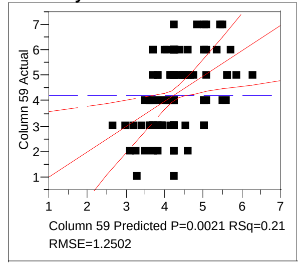
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
173.48063	111	1.5628886	0.2137	0.1428	-4.186418	64.94948

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.81287671	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.854713	0.545	0.4621
		whattypesystemsembedded{0-1}	0	1	0.2848	0.181	0.6714
	X	whattypesystemscommunications{0-1}	0.30431091	1	6.868883	4.395	0.0383
		whattypesystemsdevice{0-1}	0	1	0.420943	0.268	0.6060
		whattypeshrinkbusiness{0-1}	0	1	0.265706	0.169	0.6820
	X	whattypeshrinkutilities{0-1}	-0.6082568	1	6.340475	4.057	0.0464
		whattypeshrinkinternet{0-1}	0	1	0.22584	0.143	0.7057
		whattypecomponentdomain{0-1}	0	1	1.504342	0.962	0.3288
		whattypecomponentCASE{0-1}	0	1	0.141421	0.090	0.7651
		whattypecomponentclass{0-1}	0	1	0.830824	0.529	0.4684
	X	whattypecomponentOS{0-1}	0.3696466	1	3.94366	2.523	0.1150
	X	whattypecomponentdevelopment{0-1}	-0.421562	1	11.94422	7.642	0.0067
		whattypeenterpriseacctng{0-1}	0	1	0.090616	0.057	0.8110
		whattypeenterprisemanufact{0-1}	0	1	0.043839	0.028	0.8679
		whattypeenterprisepayroll{0-1}	0	1	0.492515	0.313	0.5769
	X	whattypeenterpriseOES{0-1}	0.58363878	1	2.587659	1.656	0.2009
		whattypeenterprisescripting{0-1}	0	1	0.659303	0.420	0.5185
		whattypeenterpriseweb{0-1}	0	1	0.012623	0.008	0.9289
		whatprocessrequirements{0-1}	0	1	0.111326	0.071	0.7909
	X	whatprocessdesign{0-1}	-0.2590507	1	5.487904	3.511	0.0636
		whatprocesstesting{0-1}	0	1	0.005561	0.004	0.9528
		whatprocessmaintenance{0-1}	0	1	0.010112	0.006	0.9363
	X	whatprocessreengineering{0-1}	0.2077958	1	3.053797	1.954	0.1649
		whatprocessappsuppt{0-1}	0	1	0.863636	0.550	0.4598
		whatprocesstraining{0-1}	0	1	0.093804	0.060	0.8077
		whatprocessspecification{0-1}	0	1	0.932767	0.595	0.4423
		whatprocessdocumentation{0-1}	0	1	0.106412	0.068	0.7955
	X	whatprocesscoding{0-1}	0.26027606	1	3.654039	2.338	0.1291
		whatprocessfielding{0-1}	0	1	0.794367	0.506	0.4784
		whatprocessCM{0-1}	0	1	1.604069	1.027	0.3132
		whatprocesstoolsuppt{0-1}	0	1	1.058588	0.675	0.4130
		whatprocessSWEngSuppt{0-1}	0	1	0.581387	0.370	0.5443
	X	whatprocessnone{0-1}	-0.6424936	1	2.936087	1.879	0.1733
		whatproductscustom{0-1}	0	1	1.12927	0.721	0.3977
	X	whatproductsCOTS{0-1}	-0.392169	1	10.80005	6.910	0.0098
		whatproductscommoncust{0-1}	0	1	0.212798	0.135	0.7139
		whatproductsnone{0-1}	0	1	0.286422	0.182	0.6706

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsCOTS{0-1}	Entered	0.0168	10.31003	0.0467	-1.844	2
2	whattypeshrinkutilities{0-1}	Entered	0.0614	6.118156	0.0745	-3.223	3
3	whattypecomponentdevelopment{0-1}	Entered	0.1027	4.575584	0.0952	-3.75	4
4	whattypesystemscommunications{0-1}	Entered	0.0751	5.353451	0.1195	-4.707	5
5	whatprocessnone{0-1}	Entered	0.1113	4.217847	0.1386	-5.036	6
6	whatprocessreengineering{0-1}	Entered	0.1317	3.734342	0.1555	-5.099	7
7	whatprocessdesign{0-1}	Entered	0.1462	3.434737	0.1711	-4.996	8
8	whatprocesscoding{0-1}	Entered	0.1694	3.044465	0.1849	-4.677	9
9	whattypecomponentOS{0-1}	Entered	0.1245	3.766049	0.2019	-4.757	10
10	whattypeenterpriseOES{0-1}	Entered	0.2009	2.587659	0.2137	-4.186	11

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.213678
RSquare Adj	0.142838
Root Mean Square Error	1.250155
Mean of Response	4.245902
Observations (or Sum Wgts)	122

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	47.14232	4.71423	3.0164
Error	111	173.48063	1.56289	Prob > F
C. Total	121	220.62295		0.0021

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	33	43.42869	1.31602	0.7893
Pure Error	78	130.05195	1.66733	Prob > F
Total Error	111	173.48063		0.7730
				Max RSq
				0.4105

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.2150128	0.312235	13.50	<.0001
whattypesystemscommunications[1-0]	-0.608622	0.290314	-2.10	0.0383
whattypeshrinkutilities[1-0]	1.2165136	0.603977	2.01	0.0464
whattypecomponentOS[1-0]	-0.739293	0.465405	-1.59	0.1150
whattypecomponentdevelopment[1-0]	0.843124	0.304984	2.76	0.0067
whattypeenterpriseOES[1-0]	-1.167278	0.907162	-1.29	0.2009
whatprocessdesign[1-0]	0.5181014	0.276487	1.87	0.0636
whatprocessreengineering[1-0]	-0.415592	0.297311	-1.40	0.1649
whatprocesscoding[1-0]	-0.520552	0.340441	-1.53	0.1291
whatprocessnone[1-0]	1.2849872	0.937515	1.37	0.1733
whatproductsCOTS[1-0]	0.7843379	0.298369	2.63	0.0098

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	6.868883	4.3950	0.0383
whattypeshrinkutilities	1	1	6.340475	4.0569	0.0464
whattypecomponentOS	1	1	3.943660	2.5233	0.1150
whattypecomponentdevelopment	1	1	11.944224	7.6424	0.0067
whattypeenterpriseOES	1	1	2.587659	1.6557	0.2009
whatprocessdesign	1	1	5.487904	3.5114	0.0636
whatprocessreengineering	1	1	3.053797	1.9539	0.1649
whatprocesscoding	1	1	3.654039	2.3380	0.1291
whatprocessnone	1	1	2.936087	1.8786	0.1733
whatproductsCOTS	1	1	10.800048	6.9103	0.0098

Rework = 4.22 + sys-comm(-0.61) + shrink-util(1.22) + comp-OS(-0.74) + comp-dev(0.84) + ent-OES(-1.17) + proc-des(0.52) +proc-reeng(-0.42) + proc-coding(-0.52) + proc-none(1.28) + prod-COTS(0.78)

Stepwise Fit - Combined Survey Data - Consequences (Visibility)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
158.35814	111	1.4266499	0.3228	0.2557	-0.492922	55.079

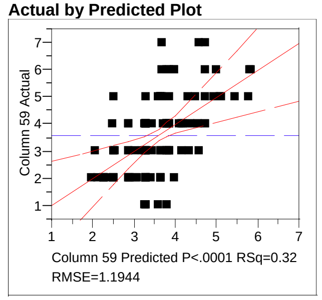
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.86890586	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.091465	0.064	0.8014
		whattypesystemsembedded{0-1}	0	1	1.64202	1.153	0.2854
	X	whattypesystemscommunications{0-1}	-0.2541736	1	5.048573	3.539	0.0626
		whattypesystemsdevice{0-1}	0	1	0.392463	0.273	0.6022
	X	whattypeshrinkbusiness{0-1}	-0.2772284	1	6.279905	4.402	0.0382
		whattypeshrinkutilities{0-1}	0	1	0.359519	0.250	0.6179
		whattypeshrinkinternet{0-1}	0	1	0.401354	0.279	0.5981
		whattypecomponentdomain{0-1}	0	1	1.697239	1.192	0.2774
		whattypecomponentCASE{0-1}	0	1	0.158115	0.110	0.7408
		whattypecomponentclass{0-1}	0	1	1.331849	0.933	0.3362
		whattypecomponentOS{0-1}	0	1	0.103933	0.072	0.7886
		whattypecomponentdevelopment{0-1}	0	1	0.073543	0.051	0.8216
		whattypeenterpriseacctng{0-1}	0	1	0.112491	0.078	0.7803
		whattypeenterprisemanufact{0-1}	0	1	0.156561	0.109	0.7421
		whattypeenterprisepayroll{0-1}	0	1	0.077588	0.054	0.8168
	X	whattypeenterpriseOES{0-1}	-1.0290139	1	7.93466	5.562	0.0201
		whattypeenterprisescripting{0-1}	0	1	1.82071	1.279	0.2605
		whattypeenterpriseweb{0-1}	0	1	1.584916	1.112	0.2939
		whatprocessrequirements{0-1}	0	1	0.193714	0.135	0.7143
		whatprocessdesign{0-1}	0	1	0.10288	0.072	0.7897
		whatprocesstesting{0-1}	0	1	0.051857	0.036	0.8498
		whatprocessmaintenance{0-1}	0	1	0.563034	0.392	0.5323
	X	whatprocessreengineering{0-1}	-0.1906506	1	2.50037	1.753	0.1883
	X	whatprocessappsuppt{0-1}	-0.3483678	1	7.903873	5.540	0.0203
		whatprocesstraining{0-1}	0	1	0.015385	0.011	0.9178
		whatprocessspecification{0-1}	0	1	0.171667	0.119	0.7304
		whatprocessdocumentation{0-1}	0	1	0.199242	0.139	0.7104
	X	whatprocesscoding{0-1}	0.18443306	1	2.203369	1.544	0.2166
	X	whatprocessfielding{0-1}	0.65864736	1	18.51537	12.978	0.0005
		whatprocessCM{0-1}	0	1	0.000158	0.000	0.9916
		whatprocesstoolsuppt{0-1}	0	1	0.663244	0.463	0.4978
		whatprocessSWEngSuppt{0-1}	0	1	1.494537	1.048	0.3082
	X	whatprocessnone{0-1}	1.09808057	1	6.561818	4.599	0.0342
	X	whatproductscustom{0-1}	-0.3885451	1	12.72592	8.920	0.0035
		whatproductsCOTS{0-1}	0	1	1.169263	0.818	0.3677
	X	whatproductscommoncust{0-1}	-0.18332	1	2.347732	1.646	0.2022
	X	whatproductsnone{0-1}	-1.2801653	1	26.43738	18.531	0.0000

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsnone{0-1}	Entered	0.0117	12.00514	0.0513	19.001	2
2	whatproductscustom{0-1}	Entered	0.0064	13.39518	0.1086	12.669	3
3	whattypecomponentclass{0-1}	Entered	0.0325	7.888774	0.1424	9.7617	4
4	whatprocessfielding{0-1}	Entered	0.0513	6.37973	0.1696	7.7932	5
5	whatprocessappsuppt{0-1}	Entered	0.0112	10.44024	0.2143	3.2988	6
6	whattypesystemscommunications{0-1}	Entered	0.0537	5.826821	0.2392	1.6742	7
7	whatprocessnone{0-1}	Entered	0.0838	4.586294	0.2588	0.8213	8
8	whattypeshrinkbusiness{0-1}	Entered	0.0932	4.250829	0.2770	0.177	9
9	whattypeenterpriseOES{0-1}	Entered	0.0499	5.682871	0.3013	-1.358	10
10	whattypecomponentclass{0-1}	Removed	0.2604	1.8504	0.2934	-2.207	9
11	whatprocesscoding{0-1}	Entered	0.2062	2.330128	0.3033	-1.656	10
12	whatprocessreengineering{0-1}	Entered	0.2170	2.21219	0.3128	-1.033	11
13	whatproductscommoncust{0-1}	Entered	0.2022	2.347732	0.3228	-0.493	12

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.322832
RSquare Adj	0.255726
Root Mean Square Error	1.194424
Mean of Response	3.585366
Observations (or Sum Wgts)	123

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	75.49552	6.86323	4.8107
Error	111	158.35814	1.42665	Prob > F
C. Total	122	233.85366		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	43	53.78591	1.25084	0.8134
Pure Error	68	104.57222	1.53783	Prob > F
Total Error	111	158.35814		0.7640
				Max RSq
				0.5528

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2.8586022	0.34161	8.37	<.0001
whattypesystemscommunications[1-0]	0.5083472	0.270231	1.88	0.0626
whattypeshrinkbusiness[1-0]	0.5544567	0.264271	2.10	0.0382
whattypeenterpriseOES[1-0]	2.0580277	0.872661	2.36	0.0201
whatprocessreengineering[1-0]	0.3813011	0.288021	1.32	0.1883
whatprocessappsuppt[1-0]	0.6967357	0.29601	2.35	0.0203
whatprocesscoding[1-0]	-0.368866	0.296814	-1.24	0.2166
whatprocessfielding[1-0]	-1.317295	0.365658	-3.60	0.0005
whatprocessnone[1-0]	-2.196161	1.024026	-2.14	0.0342
whatproductscustom[1-0]	0.7770903	0.260187	2.99	0.0035
whatproductscommoncust[1-0]	0.36664	0.285808	1.28	0.2022
whatproductsnone[1-0]	2.5603306	0.594765	4.30	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	5.048573	3.5388	0.0626
whattypeshrinkbusiness	1	1	6.279905	4.4019	0.0382
whattypeenterpriseOES	1	1	7.934660	5.5617	0.0201
whatprocessreengineering	1	1	2.500370	1.7526	0.1883
whatprocessappsuppt	1	1	7.903873	5.5402	0.0203
whatprocesscoding	1	1	2.203369	1.5444	0.2166
whatprocessfielding	1	1	18.515375	12.9782	0.0005
whatprocessnone	1	1	6.561818	4.5995	0.0342
whatproductscustom	1	1	12.725925	8.9201	0.0035
whatproductscommoncust	1	1	2.347732	1.6456	0.2022
whatproductsnone	1	1	26.437376	18.5311	<.0001

Visibility = 2.86 + sys-comm(0.51) + shrink-bus(0.55) + ent-OES(2.06) + proc-reeng(0.38) + proc-appsup(0.70) + proc-coding(-0.37) + proc-field(-1.32) + proc-none(-2.20) + prod-cust(0.78) + prod-comcust(0.37) + prod-none(2.56)

Stepwise Fit - Combined Survey Data - Consequences (ControlProduct)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
149.55216	114	1.3118611	0.3039	0.2429	-1.000899	44.41644

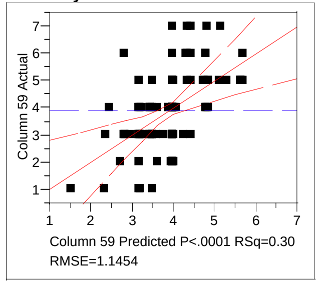
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.39807857	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.781292	0.593	0.4427
	X	whattypesystemsembedded{0-1}	0.27157371	1	3.401116	2.593	0.1101
		whattypesystemscommunications{0-1}	0	1	1.150687	0.876	0.3512
		whattypesystemsdevice{0-1}	0	1	0.408255	0.309	0.5792
		whattypeshrinkbusiness{0-1}	0	1	0.049642	0.038	0.8468
	X	whattypeshrinkutilities{0-1}	-0.8418239	1	11.6627	8.890	0.0035
		whattypeshrinkinternet{0-1}	0	1	0.618538	0.469	0.4947
	X	whattypecomponentdomain{0-1}	0.39122876	1	4.070965	3.103	0.0808
		whattypecomponentCASE{0-1}	0	1	0.305409	0.231	0.6315
		whattypecomponentclass{0-1}	0	1	0.002439	0.002	0.9658
		whattypecomponentOS{0-1}	0	1	1.50076	1.145	0.2868
		whattypecomponentdevelopment{0-1}	0	1	0.210125	0.159	0.6908
		whattypeenterpriseacctng{0-1}	0	1	1.090822	0.830	0.3641
		whattypeenterprisemanufact{0-1}	0	1	1.035315	0.788	0.3767
		whattypeenterprisepayroll{0-1}	0	1	0.591976	0.449	0.5041
		whattypeenterpriseOES{0-1}	0	1	0.220122	0.167	0.6840
		whattypeenterprisescripting{0-1}	0	1	0.048012	0.036	0.8493
		whattypeenterpriseweb{0-1}	0	1	1.02201	0.778	0.3798
		whatprocessrequirements{0-1}	0	1	0.668217	0.507	0.4778
		whatprocessdesign{0-1}	0	1	0.279946	0.212	0.6462
		whatprocesstesting{0-1}	0	1	0.709319	0.539	0.4646
		whatprocessmaintenance{0-1}	0	1	1.378113	1.051	0.3075
	X	whatprocessreengineering{0-1}	-0.4178804	1	11.5409	8.797	0.0037
	X	whatprocessappsuppt{0-1}	-0.4136855	1	10.46595	7.978	0.0056
		whatprocesstraining{0-1}	0	1	1.101103	0.838	0.3619
		whatprocessspecification{0-1}	0	1	0.21449	0.162	0.6878
	X	whatprocessdocumentation{0-1}	-0.2246851	1	2.087969	1.592	0.2097
		whatprocesscoding{0-1}	0	1	0.052207	0.039	0.8429
	X	whatprocessfielding{0-1}	0.5839269	1	13.73191	10.468	0.0016
		whatprocessCM{0-1}	0	1	1.379668	1.052	0.3072
	X	whatprocesstoolsuppt{0-1}	0.24238327	1	3.645529	2.779	0.0983
		whatprocessSWEngSuppt{0-1}	0	1	0.773598	0.588	0.4450
		whatprocessnone{0-1}	0	1	0.08412	0.064	0.8014
		whatproductscustom{0-1}	0	1	0.719046	0.546	0.4615
	X	whatproductsCOTS{0-1}	0.40089332	1	10.74864	8.193	0.0050
		whatproductscommoncust{0-1}	0	1	1.477006	1.127	0.2906
	X	whatproductsnone{0-1}	-0.4394939	1	4.861569	3.706	0.0567

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessfielding{0-1}	Entered	0.0136	10.41445	0.0485	18.43	2
2	whatprocessappsuppt{0-1}	Entered	0.0022	15.17643	0.1191	10.079	3
3	whatproductsnone{0-1}	Entered	0.0254	7.684275	0.1549	6.8382	4
4	whatprocessreengineering{0-1}	Entered	0.0310	6.935124	0.1872	4.1082	5
5	whatproductsCOTS{0-1}	Entered	0.0478	5.680442	0.2136	2.234	6
6	whattypeshrinkutilities{0-1}	Entered	0.0234	7.232595	0.2473	-0.699	7
7	whatprocesstoolsuppt{0-1}	Entered	0.0804	4.189049	0.2668	-1.556	8
8	whattypecomponentdomain{0-1}	Entered	0.1059	3.526401	0.2832	-1.961	9
9	whattypesystemsembedded{0-1}	Entered	0.1828	2.369105	0.2942	-1.577	10
10	whatprocessdocumentation{0-1}	Entered	0.2097	2.087969	0.3039	-1.001	11

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.303916
RSquare Adj	0.242856
Root Mean Square Error	1.145365
Mean of Response	3.904
Observations (or Sum Wgts)	125

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	10	65.29584	6.52958	4.9773
Error	114	149.55216	1.31186	Prob > F
C. Total	124	214.84800		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	36	52.03764	1.44549	1.1562
Pure Error	78	97.51452	1.25019	Prob > F
Total Error	114	149.55216		0.2924
				Max RSq
				0.5461

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.9505157	0.149943	26.35	<.0001
whattypesystemsembedded[1-0]	-0.543147	0.337327	-1.61	0.1101
whattypeshrinkutilities[1-0]	1.6836479	0.564671	2.98	0.0035
whattypecomponentdomain[1-0]	-0.782458	0.444177	-1.76	0.0808
whatprocessreengineering[1-0]	0.8357607	0.281777	2.97	0.0037
whatprocessappsuppt[1-0]	0.8273711	0.292924	2.82	0.0056
whatprocessdocumentation[1-0]	0.4493702	0.356194	1.26	0.2097
whatprocessfielding[1-0]	-1.167854	0.360966	-3.24	0.0016
whatprocesstoolsuppt[1-0]	-0.484767	0.290801	-1.67	0.0983
whatproductsCOTS[1-0]	-0.801787	0.280108	-2.86	0.0050
whatproductsnone[1-0]	0.8789878	0.456603	1.93	0.0567

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	3.401116	2.5926	0.1101
whattypeshrinkutilities	1	1	11.662705	8.8902	0.0035
whattypecomponentdomain	1	1	4.070965	3.1032	0.0808
whatprocessreengineering	1	1	11.540897	8.7973	0.0037
whatprocessappsuppt	1	1	10.465953	7.9779	0.0056
whatprocessdocumentation	1	1	2.087969	1.5916	0.2097
whatprocessfielding	1	1	13.731912	10.4675	0.0016
whatprocesstoolsuppt	1	1	3.645529	2.7789	0.0983
whatproductsCOTS	1	1	10.748639	8.1934	0.0050
whatproductsnone	1	1	4.861569	3.7059	0.0567

ControlProduct = 3.95 + sys-embed(-0.54) + shrink-util(1.68) + comp-domain(-0.78) + proc-reeng(0.84) + proc-appsup(0.83) + proc-doc(0.45) + proc-field(-1.17) + proc_toolsup(-0.48) + prod-COTS(-0.80) + prod-none(0.88)

Stepwise Fit - Combined Survey Data - Consequences (ChangeCost)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
182.1889	109	1.6714578	0.2761	0.1831	1.0826579	77.71055

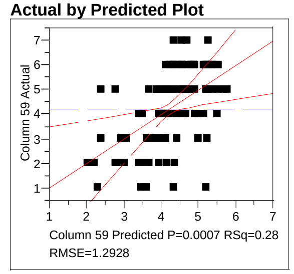
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	5.27126411	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.5939639	1	7.716578	4.617	0.0339
		whattypesystemsembedded{0-1}	0	1	0.719231	0.428	0.5143
		whattypesystemscommunications{0-1}	0	1	0.523547	0.311	0.5781
		whattypesystemsdevice{0-1}	0	1	0.039326	0.023	0.8789
	X	whattypeshrinkbusiness{0-1}	0.23493251	1	4.200341	2.513	0.1158
		whattypeshrinkutilities{0-1}	0	1	0.083262	0.049	0.8246
	X	whattypeshrinkinternet{0-1}	0.24817787	1	2.58409	1.546	0.2164
		whattypecomponentdomain{0-1}	0	1	0.51206	0.304	0.5823
		whattypecomponentCASE{0-1}	0	1	1.594578	0.954	0.3310
	X	whattypecomponentclass{0-1}	0.63733259	1	6.705303	4.012	0.0477
	X	whattypecomponentOS{0-1}	-0.3885275	1	4.236056	2.534	0.1143
		whattypecomponentdevelopment{0-1}	0	1	1.31359	0.784	0.3778
		whattypeenterpriseacctng{0-1}	0	1	1.351273	0.807	0.3710
	X	whattypeenterprisemanufact{0-1}	-0.6949918	1	6.883628	4.118	0.0449
		whattypeenterprisepayroll{0-1}	0	1	1.653086	0.989	0.3222
		whattypeenterpriseOES{0-1}	0	1	1.563605	0.935	0.3357
		whattypeenterprisescripting{0-1}	0	1	0.872628	0.520	0.4725
		whattypeenterpriseweb{0-1}	0	1	0.245861	0.146	0.7032
		whatprocessrequirements{0-1}	0	1	0.830499	0.495	0.4834
	X	whatprocessdesign{0-1}	-0.230211	1	2.986489	1.787	0.1841
	X	whatprocesstesting{0-1}	0.32425223	1	7.071045	4.230	0.0421
		whatprocessmaintenance{0-1}	0	1	0.49454	0.294	0.5888
		whatprocessreengineering{0-1}	0	1	0.320418	0.190	0.6636
		whatprocessappsuppt{0-1}	0	1	0.098376	0.058	0.8096
		whatprocesstraining{0-1}	0	1	0.868856	0.518	0.4735
	X	whatprocessspecification{0-1}	-0.331706	1	7.468708	4.468	0.0368
		whatprocessdocumentation{0-1}	0	1	0.920031	0.548	0.4607
		whatprocesscoding{0-1}	0	1	0.04385	0.026	0.8722
		whatprocessfielding{0-1}	0	1	0.018616	0.011	0.9165
	X	whatprocessCM{0-1}	0.27679138	1	4.573154	2.736	0.1010
		whatprocesstoolsuppt{0-1}	0	1	1.670843	1.000	0.3196
		whatprocessSWEngSuppt{0-1}	0	1	2.059798	1.235	0.2689
	X	whatprocessnone{0-1}	-0.7388523	1	3.041814	1.820	0.1801
		whatproductscustom{0-1}	0	1	0.360992	0.214	0.6443
	X	whatproductsCOTS{0-1}	-0.1975663	1	2.787146	1.667	0.1993
	X	whatproductscommoncust{0-1}	-0.3805012	1	10.24175	6.127	0.0148
	X	whatproductsnone{0-1}	0.67920278	1	7.941852	4.751	0.0314

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductsnone{0-1}	Entered	0.0086	13.8972	0.0552	4.0952	2
2	whattypecomponentclass{0-1}	Entered	0.0317	8.932005	0.0907	1.4337	3
3	whatproductscommoncust{0-1}	Entered	0.0469	7.438187	0.1203	-0.448	4
4	whatprocesstesting{0-1}	Entered	0.1274	4.30053	0.1374	-0.693	5
5	whattypesystemsavionics{0-1}	Entered	0.1138	4.572401	0.1555	-1.079	6
6	whatprocessspecification{0-1}	Entered	0.0953	5.015248	0.1754	-1.696	7
7	whattypeenterprisemanufact{0-1}	Entered	0.1405	3.865907	0.1908	-1.714	8
8	whattypeshrinkbusiness{0-1}	Entered	0.1588	3.500871	0.2047	-1.541	9
9	whatprocessnone{0-1}	Entered	0.1537	3.556793	0.2188	-1.397	10
10	whattypecomponentOS{0-1}	Entered	0.1842	3.057907	0.2310	-0.993	11
11	whatprocessdesign{0-1}	Entered	0.2153	2.647287	0.2415	-0.375	12
12	whatprocessCM{0-1}	Entered	0.1426	3.677618	0.2561	-0.294	13
13	whatproductsCOTS{0-1}	Entered	0.2305	2.442474	0.2658	0.4313	14
14	whattypeshrinkinternet{0-1}	Entered	0.2164	2.58409	0.2761	1.0827	15

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.276102
RSquare Adj	0.183124
Root Mean Square Error	1.292849
Mean of Response	4.225806
Observations (or Sum Wgts)	124

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	69.48852	4.96347	2.9695
Error	109	182.18890	1.67146	Prob > F
C. Total	123	251.67742		0.0007

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	48	98.63890	2.05498	1.5003
Pure Error	61	83.55000	1.36967	Prob > F
Total Error	109	182.18890		0.0671
				Max RSq
				0.6680

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1156334	0.29475	13.96	<.0001
whattypesystemsavionics[1-0]	1.1879278	0.552873	2.15	0.0339
whattypeshrinkbusiness[1-0]	-0.469865	0.2964	-1.59	0.1158
whattypeshrinkinternet[1-0]	-0.496356	0.399197	-1.24	0.2164
whattypecomponentclass[1-0]	-1.274665	0.636407	-2.00	0.0477
whattypecomponentOS[1-0]	0.7770549	0.488111	1.59	0.1143
whattypeenterprisemanufact[1-0]	1.3899836	0.684934	2.03	0.0449
whatprocessdesign[1-0]	0.460422	0.344448	1.34	0.1841
whatprocesstesting[1-0]	-0.648504	0.315296	-2.06	0.0421
whatprocessspecification[1-0]	0.6634121	0.31384	2.11	0.0368
whatprocessCM[1-0]	-0.553583	0.334674	-1.65	0.1010
whatprocessnone[1-0]	1.4777047	1.095391	1.35	0.1801
whatproductsCOTS[1-0]	0.3951327	0.305993	1.29	0.1993
whatproductscommoncust[1-0]	0.7610024	0.30743	2.48	0.0148
whatproductsnone[1-0]	-1.358406	0.623184	-2.18	0.0314

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	7.716578	4.6167	0.0339
whattypeshrinkbusiness	1	1	4.200341	2.5130	0.1158
whattypeshrinkinternet	1	1	2.584090	1.5460	0.2164
whattypecomponentclass	1	1	6.705303	4.0116	0.0477
whattypecomponentOS	1	1	4.236056	2.5343	0.1143
whattypeenterprisemanufact	1	1	6.883628	4.1183	0.0449
whatprocessdesign	1	1	2.986489	1.7868	0.1841
whatprocesstesting	1	1	7.071045	4.2305	0.0421
whatprocessspecification	1	1	7.468708	4.4684	0.0368
whatprocessCM	1	1	4.573154	2.7360	0.1010
whatprocessnone	1	1	3.041814	1.8199	0.1801
whatproductsCOTS	1	1	2.787146	1.6675	0.1993
whatproductscommoncust	1	1	10.241752	6.1274	0.0148
whatproductsnone	1	1	7.941852	4.7515	0.0314

ChangeCost = 4.12 + sys-avia(1.19) + shrink-bus(-0.47) + shrink-int(-0.50) + comp-class(-1.27) + comp-OS(0.78) + ent-mnft(1.39) + proc-des(0.46) + proc-test(-0.65) + proc-spec(0.66) + proc-CM(-0.55) + proc-none(1.48) + prod-COTS(0.40) + prod-comcust(0.76) + prod-none(-1.36)

Stepwise Fit - Combined Survey Data - Consequences (LangCulture)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
85.614974	110	0.7783179	0.2228	0.1451	-3.851436	-19.2076

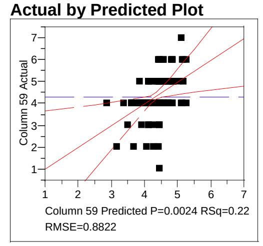
Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.6380565	1	0	0.000	1.0000
	X	whattypesystemsavionics{0-1}	-0.3500808	1	2.948675	3.789	0.0542
	X	whattypesystemsembedded{0-1}	-0.2931314	1	3.846151	4.942	0.0283
		whattypesystemscommunications{0-1}	0	1	0.021928	0.028	0.8676
		whattypesystemsdevice{0-1}	0	1	0.062169	0.079	0.7789
		whattypeshrinkbusiness{0-1}	0	1	0.359798	0.460	0.4991
		whattypeshrinkutilities{0-1}	0	1	0.440956	0.564	0.4541
		whattypeshrinkinternet{0-1}	0	1	0.000432	0.001	0.9813
		whattypecomponentdomain{0-1}	0	1	0.169986	0.217	0.6424
		whattypecomponentCASE{0-1}	0	1	0.40814	0.522	0.4715
	X	whattypecomponentclass{0-1}	0.63799671	1	4.917043	6.318	0.0134
	X	whattypecomponentOS{0-1}	0.37983132	1	3.966181	5.096	0.0260
	X	whattypecomponentdevelopment{0-1}	0.14034206	1	1.298713	1.669	0.1992
	X	whattypeenterpriseacctng{0-1}	-0.2070367	1	1.270391	1.632	0.2041
		whattypeenterprisemanufact{0-1}	0	1	0.439016	0.562	0.4551
	X	whattypeenterprisepayroll{0-1}	-0.5678941	1	5.056645	6.497	0.0122
		whattypeenterpriseOES{0-1}	0	1	0.11079	0.141	0.7078
		whattypeenterprisescripting{0-1}	0	1	0.236924	0.302	0.5835
		whattypeenterpriseweb{0-1}	0	1	0.313628	0.401	0.5280
		whatprocessrequirements{0-1}	0	1	0.956486	1.232	0.2696
		whatprocessdesign{0-1}	0	1	0.173837	0.222	0.6386
		whatprocesstesting{0-1}	0	1	0.289753	0.370	0.5442
		whatprocessmaintenance{0-1}	0	1	0.917058	1.180	0.2797
		whatprocessreengineering{0-1}	0	1	0.014185	0.018	0.8933
	X	whatprocessappsuppt{0-1}	0.25714825	1	3.893406	5.002	0.0273
		whatprocesstraining{0-1}	0	1	1.002621	1.292	0.2582
		whatprocessspecification{0-1}	0	1	0.082599	0.105	0.7462
		whatprocessdocumentation{0-1}	0	1	0.132814	0.169	0.6815
		whatprocesscoding{0-1}	0	1	0.099159	0.126	0.7229
		whatprocessfielding{0-1}	0	1	0.686525	0.881	0.3500
		whatprocessCM{0-1}	0	1	0.000019	0.000	0.9961
		whatprocesstoolsuppt{0-1}	0	1	0.005267	0.007	0.9349
	X	whatprocessSWEngSuppt{0-1}	-0.1463898	1	1.711346	2.199	0.1410
		whatprocessnone{0-1}	0	1	0.026231	0.033	0.8553
		whatproductscustom{0-1}	0	1	0.483697	0.619	0.4330
	X	whatproductsCOTS{0-1}	-0.1588631	1	1.736235	2.231	0.1382
	X	whatproductscommoncust{0-1}	-0.2182791	1	3.597185	4.622	0.0338
		whatproductnone{0-1}	0	1	0.535693	0.686	0.4092

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessappsuppt{0-1}	Entered	0.0426	3.726009	0.0338	-0.953	2
2	whattypecomponentOS{0-1}	Entered	0.0649	3.017563	0.0612	-2.271	3
3	whatproductscommoncust{0-1}	Entered	0.0830	2.612083	0.0849	-3.144	4
4	whattypeshrinkbusiness{0-1}	Entered	0.1210	2.059673	0.1036	-3.409	5
5	whattypesystemsavionics{0-1}	Entered	0.2040	1.369954	0.1161	-2.915	6
6	whattypecomponentdevelopment{0-1}	Entered	0.2076	1.341197	0.1282	-2.39	7
7	whattypesystemsembedded{0-1}	Entered	0.2101	1.31984	0.1402	-1.841	8
8	whattypeshrinkbusiness{0-1}	Removed	0.2535	1.09421	0.1303	-2.638	7
9	whatprocessmaintenance{0-1}	Entered	0.1183	2.037389	0.1488	-2.879	8
10	whattypeenterprisepayroll{0-1}	Entered	0.1837	1.461845	0.1620	-2.486	9
11	whattypecomponentclass{0-1}	Entered	0.0269	3.966099	0.1980	-4.848	10
12	whatprocessSWEngSuppt{0-1}	Entered	0.2098	1.24858	0.2094	-4.221	11
13	whatproductsCOTS{0-1}	Entered	0.1956	1.322177	0.2214	-3.675	12
14	whattypeenterpriseacctng{0-1}	Entered	0.2415	1.077821	0.2312	-2.86	13
15	whatprocessmaintenance{0-1}	Removed	0.2797	0.917058	0.2228	-3.851	12

Response Column 59

Actual by Predicted Plot



Summary of Fit

RSquare	0.22284
RSquare Adj	0.145124
Root Mean Square Error	0.882223
Mean of Response	4.311475
Observations (or Sum Wgts)	122

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	24.54896	2.23172	2.8674
Error	110	85.61497	0.77832	Prob > F
C. Total	121	110.16393		0.0024

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	33	29.068942	0.880877	1.1995
Pure Error	77	56.546032	0.734364	Prob > F
Total Error	110	85.614974		0.2541
				Max RSq
				0.4867

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1116998	0.137641	29.87	<.0001
whattypesystemsavionics[1-0]	0.7001615	0.359719	1.95	0.0542
whattypesystemsembedded[1-0]	0.5862629	0.263729	2.22	0.0283
whattypecomponentclass[1-0]	-1.275993	0.507662	-2.51	0.0134
whattypecomponentOS[1-0]	-0.759663	0.336522	-2.26	0.0260
whattypecomponentdevelopment[1-0]	-0.280684	0.21729	-1.29	0.1992
whattypeenterpriseacctng[1-0]	0.4140734	0.324106	1.28	0.2041
whattypeenterprisepayroll[1-0]	1.1357881	0.445599	2.55	0.0122
whatprocessappsuppt[1-0]	-0.514297	0.229947	-2.24	0.0273
whatprocessSWEngSuppt[1-0]	0.2927796	0.197447	1.48	0.1410
whatproductsCOTS[1-0]	0.3177263	0.212729	1.49	0.1382
whatproductscommoncust[1-0]	0.4365582	0.203067	2.15	0.0338

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsavionics	1	1	2.9486750	3.7885	0.0542
whattypesystemsembedded	1	1	3.8461511	4.9416	0.0283
whattypecomponentclass	1	1	4.9170425	6.3175	0.0134
whattypecomponentOS	1	1	3.9661810	5.0958	0.0260
whattypecomponentdevelopment	1	1	1.2987132	1.6686	0.1992
whattypeenterpriseacctng	1	1	1.2703910	1.6322	0.2041
whattypeenterprisepayroll	1	1	5.0566448	6.4969	0.0122
whatprocessappsuppt	1	1	3.8934065	5.0023	0.0273
whatprocessSWEngSuppt	1	1	1.7113455	2.1988	0.1410
whatproductsCOTS	1	1	1.7362352	2.2308	0.1382
whatproductscommoncust	1	1	3.5971846	4.6217	0.0338

LangCult = 4.11 + sys-avia(0.70) + sys-embed(0.59) + comp-class(-1.28) + comp-OS(-0.76) + comp-dev(-0.28) + ent-acct(0.41) + ent-pay(1.14) + proc-appsup(-0.51) + proc+SWEngSup(0.29) + prod-COTS(0.32) + prod-comcust(0.44)

Stepwise Fit - Combined Survey Data - Consequences (TurfWar)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

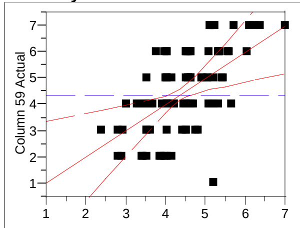
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
137.06985	105	1.3054272	0.3554	0.2572	4.4366712	48.20929

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.56688949	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.020697	0.016	0.9005
	X	whattypesystemsembedded{0-1}	-0.2365855	1	2.419592	1.853	0.1763
		whattypesystemscommunications{0-1}	0	1	0.363862	0.277	0.5999
		whattypesystemsdevice{0-1}	0	1	0.258886	0.197	0.6582
		whattypeshrinkbusiness{0-1}	0	1	0.486793	0.371	0.5440
		whattypeshrinkutilities{0-1}	0	1	0.003339	0.003	0.9600
		whattypeshrinkinternet{0-1}	0	1	0.013964	0.011	0.9182
		whattypecomponentdomain{0-1}	0	1	0.000435	0.000	0.9855
	X	whattypecomponentCASE{0-1}	0.52026112	1	4.303907	3.297	0.0723
		whattypecomponentclass{0-1}	0	1	0.364638	0.277	0.5995
	X	whattypecomponentOS{0-1}	0.53528226	1	7.571654	5.800	0.0178
	X	whattypecomponentdevelopment{0-1}	-0.2394009	1	3.326867	2.548	0.1134
	X	whattypeenterpriseacctng{0-1}	-0.3997281	1	4.524383	3.466	0.0654
	X	whattypeenterprisemanufact{0-1}	-0.7099058	1	6.621548	5.072	0.0264
		whattypeenterprisepayroll{0-1}	0	1	0.784754	0.599	0.4408
		whattypeenterpriseOES{0-1}	0	1	0.639765	0.488	0.4865
		whattypeenterprisescripting{0-1}	0	1	0.337333	0.257	0.6136
	X	whattypeenterpriseweb{0-1}	-0.3153353	1	3.026957	2.319	0.1308
	X	whatprocessrequirements{0-1}	-0.2686756	1	5.280131	4.045	0.0469
		whatprocessdesign{0-1}	0	1	0.356763	0.271	0.6035
		whatprocesstesting{0-1}	0	1	0.914068	0.698	0.4053
		whatprocessmaintenance{0-1}	0	1	0.00006	0.000	0.9946
	X	whatprocessreengineering{0-1}	0.48676186	1	11.6541	8.927	0.0035
	X	whatprocessappsuppt{0-1}	0.57408812	1	17.99557	13.785	0.0003
	X	whatprocesstraining{0-1}	0.34172417	1	5.760811	4.413	0.0381
		whatprocessspecification{0-1}	0	1	0.564068	0.430	0.5136
		whatprocessdocumentation{0-1}	0	1	0.333817	0.254	0.6154
	X	whatprocesscoding{0-1}	0.30232284	1	5.291409	4.053	0.0466
		whatprocessfielding{0-1}	0	1	0.737188	0.562	0.4550
	X	whatprocessCM{0-1}	0.25408779	1	3.142885	2.408	0.1238
	X	whatprocesstoolsuppt{0-1}	-0.7733196	1	23.71521	18.167	0.0000
		whatprocessSWEngSuppt{0-1}	0	1	1.461392	1.121	0.2922
	X	whatprocessnone{0-1}	0.55882584	1	2.22603	1.705	0.1945
		whatproductscustom{0-1}	0	1	0.044254	0.034	0.8549
	X	whatproductsCOTS{0-1}	-0.5796411	1	20.46879	15.680	0.0001
		whatproductscommoncust{0-1}	0	1	0.466721	0.355	0.5524
		whatproductsnone{0-1}	0	1	0.000268	0.000	0.9887

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocessappsuppt{0-1}	Entered	0.0092	11.74757	0.0552	17.488	2
2	whattypeenterprisemanufact{0-1}	Entered	0.0303	7.799643	0.0919	14.228	3
3	whatproductsCOTS{0-1}	Entered	0.0283	7.748843	0.1284	11.002	4
4	whatprocesstoolsuppt{0-1}	Entered	0.0230	8.046927	0.1662	7.5755	5
5	whatprocessreengineering{0-1}	Entered	0.0526	5.674788	0.1929	5.7486	6
6	whattypecomponentOS{0-1}	Entered	0.1010	3.985615	0.2116	5.0608	7
7	whattypesystemsembedded{0-1}	Entered	0.1233	3.471789	0.2280	4.7195	8
8	whattypeenterpriseacctng{0-1}	Entered	0.1012	3.873055	0.2462	4.1076	9
9	whatprocessSWEngSuppt{0-1}	Entered	0.1548	2.88453	0.2597	4.1623	10
10	whattypecomponentdevelopment{0-1}	Entered	0.1545	2.862171	0.2732	4.2322	11
11	whatprocesscoding{0-1}	Entered	0.1077	3.610261	0.2902	3.7975	12
12	whatprocesstraining{0-1}	Entered	0.1715	2.579441	0.3023	4.058	13
13	whatprocessrequirements{0-1}	Entered	0.1513	2.814811	0.3155	4.1597	14
14	whatprocessSWEngSuppt{0-1}	Removed	0.3401	1.237236	0.3097	2.9941	13
15	whatprocessnone{0-1}	Entered	0.2098	2.131854	0.3197	3.5564	14
16	whattypecomponentCASE{0-1}	Entered	0.1983	2.230599	0.3302	4.0522	15
17	whatprocessCM{0-1}	Entered	0.1867	2.334264	0.3412	4.478	16
18	whattypeenterpriseweb{0-1}	Entered	0.1308	3.026957	0.3554	4.4367	17

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P<.0001 RSq=0.36
RMSE=1.1426

Summary of Fit

RSquare	0.355438
RSquare Adj	0.257219
Root Mean Square Error	1.142553
Mean of Response	4.377049
Observations (or Sum Wgts)	122

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	16	75.58589	4.72412	3.6188
Error	105	137.06985	1.30543	Prob > F
C. Total	121	212.65574		<.0001

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.6176517	0.282545	16.34	<.0001
whattypesystemsembedded[1-0]	0.473171	0.347555	1.36	0.1763
whattypecomponentCASE[1-0]	-1.040522	0.573055	-1.82	0.0723
whattypecomponentOS[1-0]	-1.070565	0.444523	-2.41	0.0178
whattypecomponentdevelopment[1-0]	0.4788018	0.299926	1.60	0.1134
whattypeenterpriseacctng[1-0]	0.7994561	0.429429	1.86	0.0654
whattypeenterprisemanufact[1-0]	1.4198116	0.630416	2.25	0.0264
whattypeenterpriseweb[1-0]	0.6306706	0.414167	1.52	0.1308
whatprocessrequirements[1-0]	0.5373511	0.267185	2.01	0.0469
whatprocessreengineering[1-0]	-0.973524	0.325824	-2.99	0.0035
whatprocessappsuppt[1-0]	-1.148176	0.309245	-3.71	0.0003
whatprocesstraining[1-0]	-0.683448	0.325342	-2.10	0.0381
whatprocesscoding[1-0]	-0.604646	0.300325	-2.01	0.0466
whatprocessCM[1-0]	-0.508176	0.327511	-1.55	0.1238
whatprocesstoolsuppt[1-0]	1.5466391	0.362871	4.26	<.0001
whatprocessnone[1-0]	-1.117652	0.855889	-1.31	0.1945
whatproductsCOTS[1-0]	1.1592822	0.292765	3.96	0.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	2.419592	1.8535	0.1763
whattypecomponentCASE	1	1	4.303907	3.2969	0.0723
whattypecomponentOS	1	1	7.571654	5.8001	0.0178
whattypecomponentdevelopment	1	1	3.326867	2.5485	0.1134
whattypeenterpriseacctng	1	1	4.524383	3.4658	0.0654
whattypeenterprisemanufact	1	1	6.621548	5.0723	0.0264
whattypeenterpriseweb	1	1	3.026957	2.3187	0.1308
whatprocessrequirements	1	1	5.280131	4.0448	0.0469
whatprocessreengineering	1	1	11.654100	8.9274	0.0035
whatprocessappsuppt	1	1	17.995573	13.7852	0.0003
whatprocesstraining	1	1	5.760811	4.4130	0.0381
whatprocesscoding	1	1	5.291409	4.0534	0.0466
whatprocessCM	1	1	3.142885	2.4076	0.1238
whatprocesstoolsuppt	1	1	23.715213	18.1666	<.0001
whatprocessnone	1	1	2.226030	1.7052	0.1945
whatproductsCOTS	1	1	20.468789	15.6798	0.0001

TurfWar = 4.62 + sys-embed(0.47) + comp-CASE(-1.04) + comp-OS(-1.07) + comp-dev(0.48) + ent-acct(0.80) + ent-mnft(1.42) + ent-web(0.63) + proc-req(0.54) + proc-reeng(-0.97) + proc-appsup(-1.15) + proc-train(-0.68) + proc-coding(-0.60) + proc-CM(-0.51) + proc-toolsup(1.55) + proc-none(-1.12) + prod-COTS(1.16)

Stepwise Fit - Combined Survey Data - Consequences (FailLikely)

Response:
Column 59

Stepwise Regression Control

Prob to Enter	0.250
Prob to Leave	0.250

Direction:

Rules:

Current Estimates

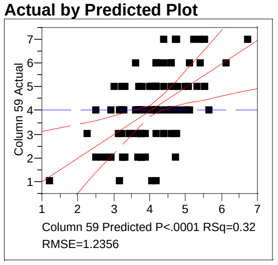
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
166.39835	109	1.5265904	0.3228	0.2358	1.7688794	66.46878

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	3.95055205	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.370571	0.241	0.6244
		whattypesystemsembedded{0-1}	0	1	0.017659	0.011	0.9149
		whattypesystemscommunications{0-1}	0	1	0.001352	0.001	0.9764
		whattypesystemsdevice{0-1}	0	1	1.213651	0.794	0.3750
		whattypeshrinkbusiness{0-1}	0	1	0.001915	0.001	0.9719
		whattypeshrinkutilities{0-1}	0	1	1.17976	0.771	0.3818
	X	whattypeshrinkinternet{0-1}	-0.2578722	1	2.810802	1.841	0.1776
	X	whattypecomponentdomain{0-1}	-0.2754059	1	2.149182	1.408	0.2380
	X	whattypecomponentCASE{0-1}	0.45796955	1	3.496079	2.290	0.1331
	X	whattypecomponentclass{0-1}	1.22898413	1	18.47525	12.102	0.0007
	X	whattypecomponentOS{0-1}	0.29528485	1	2.46399	1.614	0.2066
	X	whattypecomponentdevelopment{0-1}	-0.2013401	1	2.755115	1.805	0.1819
		whattypeenterpriseacctng{0-1}	0	1	0.531129	0.346	0.5577
	X	whattypeenterprisemanufact{0-1}	-0.670198	1	6.388775	4.185	0.0432
	X	whattypeenterprisepayroll{0-1}	-0.5688313	1	4.94407	3.239	0.0747
		whattypeenterpriseOES{0-1}	0	1	0.592608	0.386	0.5357
		whattypeenterprisescripting{0-1}	0	1	1.305427	0.854	0.3575
		whattypeenterpriseweb{0-1}	0	1	0.000002	0.000	0.9992
		whatprocessrequirements{0-1}	0	1	0.894859	0.584	0.4464
	X	whatprocessdesign{0-1}	-0.265596	1	5.376917	3.522	0.0632
		whatprocesstesting{0-1}	0	1	0.194076	0.126	0.7232
		whatprocessmaintenance{0-1}	0	1	1.555584	1.019	0.3150
		whatprocessreengineering{0-1}	0	1	0.461737	0.301	0.5847
		whatprocessappsuppt{0-1}	0	1	0.17235	0.112	0.7386
	X	whatprocesstraining{0-1}	0.24963291	1	3.709239	2.430	0.1220
		whatprocessspecification{0-1}	0	1	0.568556	0.370	0.5441
		whatprocessdocumentation{0-1}	0	1	0.881279	0.575	0.4499
		whatprocesscoding{0-1}	0	1	1.188867	0.777	0.3800
		whatprocessfielding{0-1}	0	1	0.762618	0.497	0.4822
	X	whatprocessCM{0-1}	0.63522587	1	19.60305	12.841	0.0005
	X	whatprocesstoolsuppt{0-1}	-0.7348127	1	24.08974	15.780	0.0001
		whatprocessSWEngSuppt{0-1}	0	1	0.491541	0.320	0.5728
		whatprocessnone{0-1}	0	1	0.179422	0.117	0.7334
	X	whatproductscustom{0-1}	-0.2137006	1	3.989618	2.613	0.1089
		whatproductsCOTS{0-1}	0	1	1.578858	1.035	0.3114
	X	whatproductscommoncust{0-1}	-0.413646	1	11.99162	7.855	0.0060
		whatproductsnone{0-1}	0	1	0.119167	0.077	0.7814

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whattypecomponentclass{0-1}	Entered	0.0187	10.92985	0.0445	15.125	2
2	whatproductscommoncust{0-1}	Entered	0.0076	13.499	0.0994	9.3559	3
3	whatproductscustom{0-1}	Entered	0.0700	5.994467	0.1238	7.9059	4
4	whattypeenterprisemanufact{0-1}	Entered	0.0673	5.998143	0.1482	6.4537	5
5	whatprocessCM{0-1}	Entered	0.0975	4.833965	0.1679	5.6716	6
6	whatprocesstoolsuppt{0-1}	Entered	0.0021	16.00938	0.2331	-1.542	7
7	whattypecomponentCASE{0-1}	Entered	0.1551	3.269241	0.2464	-1.424	8
8	whatprocessdesign{0-1}	Entered	0.1635	3.112914	0.2590	-1.216	9
9	whattypeenterprisepayroll{0-1}	Entered	0.1298	3.643562	0.2739	-1.313	10
10	whattypecomponentdevelopment{0-1}	Entered	0.2121	2.451961	0.2838	-0.724	11
11	whattypecomponentdomain{0-1}	Entered	0.2167	2.392106	0.2936	-0.101	12
12	whatprocesstraining{0-1}	Entered	0.2082	2.470708	0.3036	0.4774	13
13	whattypeshrinkinternet{0-1}	Entered	0.2294	2.242039	0.3128	1.187	14
14	whattypecomponentOS{0-1}	Entered	0.2066	2.46399	0.3228	1.7689	15

Response Column 59
Actual by Predicted Plot



Summary of Fit

RSquare	0.322785
RSquare Adj	0.235803
Root Mean Square Error	1.235553
Mean of Response	4.048387
Observations (or Sum Wgts)	124

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	14	79.31132	5.66509	3.7109
Error	109	166.39835	1.52659	Prob > F
C. Total	123	245.70968		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	50	80.62057	1.61241	1.1091
Pure Error	59	85.77778	1.45386	Prob > F
Total Error	109	166.39835		0.3494
				Max RSq
				0.6509

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	3.2162465	0.279705	11.50	<.0001
whattypeshrinkinternet[1-0]	0.5157443	0.380085	1.36	0.1776
whattypecomponentdomain[1-0]	0.5508117	0.464224	1.19	0.2380
whattypecomponentCASE[1-0]	-0.915939	0.605253	-1.51	0.1331
whattypecomponentclass[1-0]	-2.457968	0.706549	-3.48	0.0007
whattypecomponentOS[1-0]	-0.59057	0.46485	-1.27	0.2066
whattypecomponentdevelopment[1-0]	0.4026802	0.299745	1.34	0.1819
whattypeenterprisemanufact[1-0]	1.3403961	0.655218	2.05	0.0432
whattypeenterprisepayroll[1-0]	1.1376626	0.632168	1.80	0.0747
whatprocessdesign[1-0]	0.5311919	0.283039	1.88	0.0632
whatprocesstraining[1-0]	-0.499266	0.320295	-1.56	0.1220
whatprocessCM[1-0]	-1.270452	0.354534	-3.58	0.0005
whatprocesstoolsuppt[1-0]	1.4696255	0.369958	3.97	0.0001
whatproductscustom[1-0]	0.4274012	0.264382	1.62	0.1089
whatproductscommoncust[1-0]	0.8272921	0.295176	2.80	0.0060

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypeshrinkinternet	1	1	2.810802	1.8412	0.1776
whattypecomponentdomain	1	1	2.149182	1.4078	0.2380
whattypecomponentCASE	1	1	3.496079	2.2901	0.1331
whattypecomponentclass	1	1	18.475254	12.1023	0.0007
whattypecomponentOS	1	1	2.463990	1.6140	0.2066
whattypecomponentdevelopment	1	1	2.755115	1.8048	0.1819
whattypeenterprisemanufact	1	1	6.388775	4.1850	0.0432
whattypeenterprisepayroll	1	1	4.944070	3.2386	0.0747
whatprocessdesign	1	1	5.376917	3.5222	0.0632
whatprocesstraining	1	1	3.709239	2.4298	0.1220
whatprocessCM	1	1	19.603051	12.8411	0.0005
whatprocesstoolsuppt	1	1	24.089740	15.7801	0.0001
whatproductscustom	1	1	3.989618	2.6134	0.1089
whatproductscommoncust	1	1	11.991615	7.8552	0.0060

FailLikely = 3.22 + shrink-int(0.52) + comp-domain(0.55) + comp-CASE(-0.92) + comp-class(-2.46) + comp-OS(-0.59) + comp-dev(0.40) + ent-mnft(1.34) + ent-pay(1.14) + proc-des(0.53) + proc-train(-0.50) + proc-CM(-1.27) + proc-toolsup(1.47) + prod-cust(0.43) + prod-comcust(0.83)

Stepwise Fit - Combined Survey Data - Consequences (RespCust)
Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

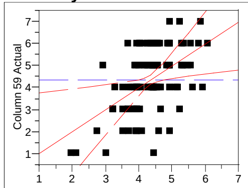
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
157.22697	108	1.4558052	0.2738	0.1662	2.0078492	62.67208

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.61847758	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.245073	0.167	0.6836
	X	whattypesystemsembedded{0-1}	0.25344136	1	2.852401	1.959	0.1645
		whattypesystemscommunications{0-1}	0	1	0.928216	0.635	0.4271
		whattypesystemsdevice{0-1}	0	1	0.07507	0.051	0.8216
		whattypeshrinkbusiness{0-1}	0	1	0.082611	0.056	0.8130
	X	whattypeshrinkutilities{0-1}	-0.6894193	1	7.407935	5.089	0.0261
		whattypeshrinkinternet{0-1}	0	1	1.299606	0.892	0.3471
	X	whattypecomponentdomain{0-1}	0.31037685	1	2.385032	1.638	0.2033
	X	whattypecomponentCASE{0-1}	-0.7770687	1	9.889576	6.793	0.0104
		whattypecomponentclass{0-1}	0	1	0.484837	0.331	0.5663
		whattypecomponentOS{0-1}	0	1	0.054864	0.037	0.8471
		whattypecomponentdevelopment{0-1}	0	1	0.020271	0.014	0.9067
		whattypeenterpriseacctng{0-1}	0	1	0.004567	0.003	0.9556
		whattypeenterprisemanufact{0-1}	0	1	1.351214	0.928	0.3377
		whattypeenterprisepayroll{0-1}	0	1	0.000259	0.000	0.9894
	X	whattypeenterpriseOES{0-1}	-0.5211476	1	2.025051	1.391	0.2408
		whattypeenterprisescripting{0-1}	0	1	0.178287	0.121	0.7281
	X	whattypeenterpriseweb{0-1}	0.22597924	1	2.229366	1.531	0.2186
	X	whatprocessrequirements{0-1}	-0.3574829	1	7.439745	5.110	0.0258
		whatprocessdesign{0-1}	0	1	0.024247	0.017	0.8980
		whatprocesstesting{0-1}	0	1	1.117871	0.766	0.3834
		whatprocessmaintenance{0-1}	0	1	0.115248	0.078	0.7799
		whatprocessreengineering{0-1}	0	1	0.31358	0.214	0.6447
		whatprocessappsuppt{0-1}	0	1	1.104345	0.757	0.3863
	X	whatprocesstraining{0-1}	-0.3401992	1	6.508563	4.471	0.0368
	X	whatprocessspecification{0-1}	0.37085993	1	8.876244	6.097	0.0151
		whatprocessdocumentation{0-1}	0	1	0.294804	0.201	0.6548
		whatprocesscoding{0-1}	0	1	0.3672	0.250	0.6178
	X	whatprocessfielding{0-1}	0.41361452	1	7.096394	4.875	0.0294
	X	whatprocessCM{0-1}	-0.4635919	1	11.66933	8.016	0.0055
		whatprocesstoolsuppt{0-1}	0	1	0.402726	0.275	0.6012
	X	whatprocessSWEngSuppt{0-1}	0.39637726	1	9.736792	6.688	0.0110
	X	whatprocessnone{0-1}	0.70355886	1	3.612233	2.481	0.1181
	X	whatproductscustom{0-1}	0.23379276	1	4.062698	2.791	0.0977
	X	whatproductsCOTS{0-1}	0.33350658	1	6.245348	4.290	0.0407
	X	whatproductscommoncust{0-1}	0.19604238	1	2.677357	1.839	0.1779
		whatproductsnone{0-1}	0	1	0.23399	0.159	0.6904

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatprocesstraining{0-1}	Entered	0.1009	4.705069	0.0217	4.2947	2
2	whattypecomponentCASE{0-1}	Entered	0.0997	4.673597	0.0433	3.53	3
3	whatprocessfielding{0-1}	Entered	0.0822	5.126642	0.0670	2.4974	4
4	whatprocessCM{0-1}	Entered	0.1026	4.453593	0.0876	1.8628	5
5	whatprocessSWEngSuppt{0-1}	Entered	0.0291	7.781651	0.1235	-0.74	6
6	whatprocessspecification{0-1}	Entered	0.1350	3.574227	0.1400	-0.855	7
7	whatprocessrequirements{0-1}	Entered	0.1183	3.857667	0.1578	-1.137	8
8	whattypeshrinkutilities{0-1}	Entered	0.1063	4.071727	0.1766	-1.545	9
9	whattypeenterpriseOES{0-1}	Entered	0.1219	3.686133	0.1937	-1.726	10
10	whatproductsCOTS{0-1}	Entered	0.1910	2.610475	0.2057	-1.27	11
11	whatproductscustom{0-1}	Entered	0.1805	2.720252	0.2183	-0.879	12
12	whatproductscommoncust{0-1}	Entered	0.1910	2.57511	0.2302	-0.403	13
13	whatprocessnone{0-1}	Entered	0.1555	3.015157	0.2441	-0.186	14
14	whattypesystemsembedded{0-1}	Entered	0.2389	2.060051	0.2536	0.5951	15
15	whattypecomponentdomain{0-1}	Entered	0.2286	2.144318	0.2635	1.3266	16
16	whattypeenterpriseweb{0-1}	Entered	0.2186	2.229366	0.2738	2.0078	17

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0023 RSq=0.27
RMSE=1.2066

Summary of Fit

RSquare	0.273819
RSquare Adj	0.166236
Root Mean Square Error	1.206568
Mean of Response	4.352
Observations (or Sum Wgts)	125

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	16	59.28503	3.70531	2.5452
Error	108	157.22697	1.45581	Prob > F
C. Total	124	216.51200		0.0023

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.9071177	0.264709	18.54	<.0001
whattypesystemsembedded[1-0]	-0.506883	0.362121	-1.40	0.1645
whattypeshrinkutilities[1-0]	1.3788387	0.611247	2.26	0.0261
whattypecomponentdomain[1-0]	-0.620754	0.48498	-1.28	0.2033
whattypecomponentCASE[1-0]	1.5541374	0.596283	2.61	0.0104
whattypeenterpriseOES[1-0]	1.0422951	0.88374	1.18	0.2408
whattypeenterpriseweb[1-0]	-0.451958	0.365224	-1.24	0.2186
whatprocessrequirements[1-0]	0.7149658	0.31627	2.26	0.0258
whatprocesstraining[1-0]	0.6803984	0.32179	2.11	0.0368
whatprocessspecification[1-0]	-0.74172	0.300384	-2.47	0.0151
whatprocessfielding[1-0]	-0.827229	0.374678	-2.21	0.0294
whatprocessCM[1-0]	0.9271838	0.327487	2.83	0.0055
whatprocessSWEngSuppt[1-0]	-0.792755	0.306537	-2.59	0.0110
whatprocessnone[1-0]	-1.407118	0.893294	-1.58	0.1181
whatproductscustom[1-0]	-0.467586	0.279902	-1.67	0.0977
whatproductsCOTS[1-0]	-0.667013	0.322038	-2.07	0.0407
whatproductscommoncust[1-0]	-0.392085	0.28912	-1.36	0.1779

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemsembedded	1	1	2.852401	1.9593	0.1645
whattypeshrinkutilities	1	1	7.407935	5.0885	0.0261
whattypecomponentdomain	1	1	2.385032	1.6383	0.2033
whattypecomponentCASE	1	1	9.889576	6.7932	0.0104
whattypeenterpriseOES	1	1	2.025051	1.3910	0.2408
whattypeenterpriseweb	1	1	2.229366	1.5314	0.2186
whatprocessrequirements	1	1	7.439745	5.1104	0.0258
whatprocesstraining	1	1	6.508563	4.4708	0.0368
whatprocessspecification	1	1	8.876244	6.0971	0.0151
whatprocessfielding	1	1	7.096394	4.8745	0.0294
whatprocessCM	1	1	11.669333	8.0157	0.0055
whatprocessSWEngSuppt	1	1	9.736792	6.6883	0.0110
whatprocessnone	1	1	3.612233	2.4813	0.1181
whatproductscustom	1	1	4.062698	2.7907	0.0977
whatproductsCOTS	1	1	6.245348	4.2900	0.0407
whatproductscommoncust	1	1	2.677357	1.8391	0.1779

ResponseCustomer = 4.91 + sys-embed(-0.51) + shrink-util(1.38) + comp-domain(-0.62) + comp-CASE(1.55) + ent-OES(1.04) + ent-web(-0.45) + proc-req(0.71) + proc-train(0.68) + proc-spec(-0.74) + proc-field(-0.83) + proc-CM(0.93) + proc-SWEngSup(-0.79) + proc-none(-1.41) + prod-cust(-0.47) + prod-COTS(-0.67) + prod-comcust(-0.39)

Stepwise Fit - Combined Survey Data - Consequences (ResponseOrg)

Response:
Column 59

Stepwise Regression Control

Prob to Enter 0.250
Prob to Leave 0.250

Direction:

Rules:

Current Estimates

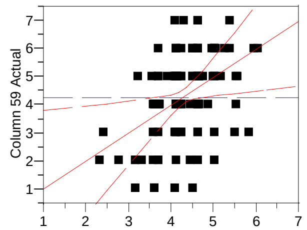
SSE	DFE	MSE	RSquare	RSquare Adj	Cp	AIC
214.07154	113	1.8944384	0.1988	0.1208	-5.89511	91.24956

Lock	Entered	Parameter	Estimate	nDF	SS	"F Ratio"	"Prob>F"
X	X	Intercept	4.94532414	1	0	0.000	1.0000
		whattypesystemsavionics{0-1}	0	1	0.000022	0.000	0.9973
		whattypesystemsembedded{0-1}	0	1	0.558277	0.293	0.5895
	X	whattypesystemscommunications{0-1}	-0.2688162	1	5.275968	2.785	0.0979
	X	whattypesystemsdevice{0-1}	0.47834009	1	6.976999	3.683	0.0575
		whattypeshrinkbusiness{0-1}	0	1	0.666903	0.350	0.5553
		whattypeshrinkutilities{0-1}	0	1	0.027499	0.014	0.9047
		whattypeshrinkinternet{0-1}	0	1	0.024793	0.013	0.9095
		whattypecomponentdomain{0-1}	0	1	1.03364	0.543	0.4626
	X	whattypecomponentCASE{0-1}	-0.8414831	1	11.93592	6.301	0.0135
		whattypecomponentclass{0-1}	0	1	0.198188	0.104	0.7479
	X	whattypecomponentOS{0-1}	-0.3677225	1	3.756402	1.983	0.1618
		whattypecomponentdevelopment{0-1}	0	1	0.361773	0.190	0.6641
		whattypeenterpriseacctng{0-1}	0	1	0.052845	0.028	0.8682
	X	whattypeenterprisemanufact{0-1}	0.64825314	1	6.105685	3.223	0.0753
		whattypeenterprisepayroll{0-1}	0	1	0.0287	0.015	0.9027
	X	whattypeenterpriseOES{0-1}	-0.7031229	1	3.767142	1.989	0.1612
		whattypeenterprisescripting{0-1}	0	1	1.776085	0.937	0.3351
		whattypeenterpriseweb{0-1}	0	1	0.0025	0.001	0.9712
	X	whatprocessrequirements{0-1}	0.25732566	1	5.270874	2.782	0.0981
		whatprocessdesign{0-1}	0	1	2.073217	1.095	0.2976
		whatprocesstesting{0-1}	0	1	0.006896	0.004	0.9522
		whatprocessmaintenance{0-1}	0	1	1.331687	0.701	0.4042
		whatprocessreengineering{0-1}	0	1	0.610359	0.320	0.5726
		whatprocessappsuppt{0-1}	0	1	0.006254	0.003	0.9545
		whatprocesstraining{0-1}	0	1	1.216748	0.640	0.4253
		whatprocessspecification{0-1}	0	1	1.135903	0.597	0.4412
		whatprocessdocumentation{0-1}	0	1	0.489486	0.257	0.6134
	X	whatprocesscoding{0-1}	-0.2029815	1	2.69195	1.421	0.2357
	X	whatprocessfielding{0-1}	0.46621156	1	9.50673	5.018	0.0270
	X	whatprocessCM{0-1}	-0.4565314	1	12.52597	6.612	0.0114
		whatprocesstoolsuppt{0-1}	0	1	0.063618	0.033	0.8555
		whatprocessSWEngSuppt{0-1}	0	1	0.450038	0.236	0.6281
		whatprocessnone{0-1}	0	1	0.190592	0.100	0.7527
	X	whatproductscustom{0-1}	0.25523252	1	6.263891	3.306	0.0717
		whatproductsCOTS{0-1}	0	1	1.448571	0.763	0.3842
		whatproductscommoncust{0-1}	0	1	0.05577	0.029	0.8647
		whatproductsnone{0-1}	0	1	0.013771	0.007	0.9325

Step History

Step	Parameter	Action	"Sig Prob"	Seq SS	RSquare	Cp	p
1	whatproductscustom{0-1}	Entered	0.0947	6.023529	0.0225	-4.968	2
2	whattypeenterprisemanufact{0-1}	Entered	0.1195	5.159982	0.0419	-5.26	3
3	whattypecomponentCASE{0-1}	Entered	0.0844	6.251471	0.0653	-6.038	4
4	whattypesystemsdevice{0-1}	Entered	0.0990	5.624373	0.0863	-6.536	5
5	whattypecomponentOS{0-1}	Entered	0.1303	4.670796	0.1038	-6.611	6
6	whatprocessCM{0-1}	Entered	0.1404	4.388318	0.1202	-6.561	7
7	whatprocessfielding{0-1}	Entered	0.0554	7.291518	0.1475	-7.8	8
8	whattypeenterpriseOES{0-1}	Entered	0.2018	3.190133	0.1594	-7.218	9
9	whattypesystemscommunications{0-1}	Entered	0.1937	3.288992	0.1717	-6.679	10
10	whatprocessrequirements{0-1}	Entered	0.1248	4.547398	0.1888	-6.699	11
11	whatprocesscoding{0-1}	Entered	0.2357	2.69195	0.1988	-5.895	12

Response Column 59
Actual by Predicted Plot



Column 59 Predicted P=0.0064 RSq=0.20
RMSE=1.3764

Summary of Fit

RSquare	0.198834
RSquare Adj	0.120844
Root Mean Square Error	1.376386
Mean of Response	4.28
Observations (or Sum Wgts)	125

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	11	53.12846	4.82986	2.5495
Error	113	214.07154	1.89444	Prob > F
C. Total	124	267.20000		0.0064

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	36	80.28582	2.23016	1.2836
Pure Error	77	133.78571	1.73748	Prob > F
Total Error	113	214.07154		0.1795
				Max RSq
				0.4993

Parameter Estimates

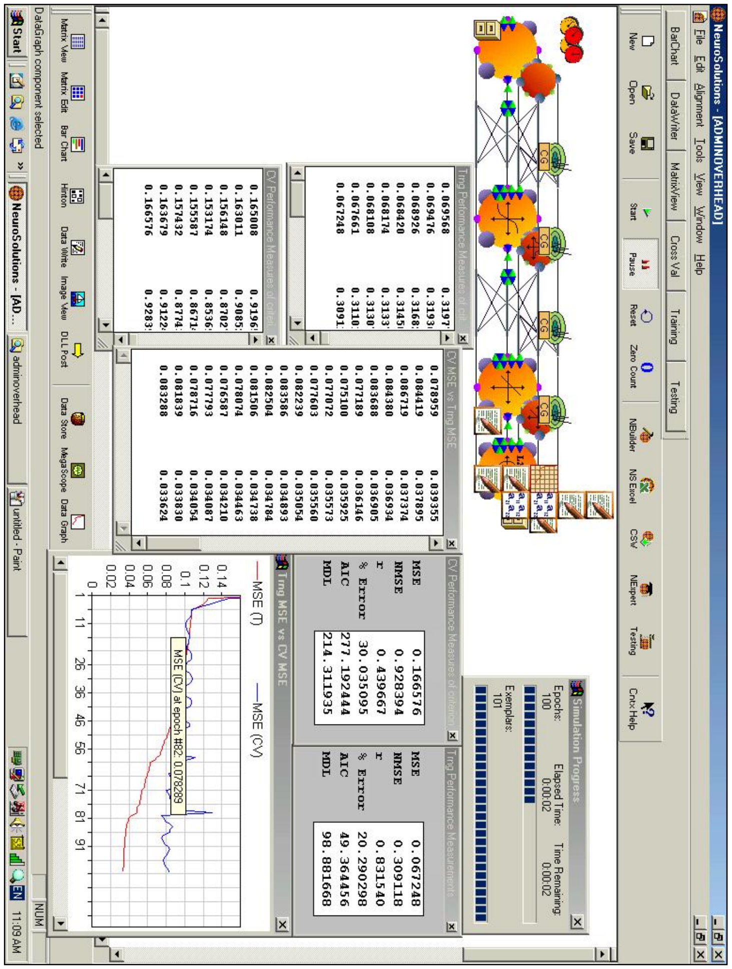
Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.2100264	0.33382	12.61	<.0001
whattypesystemscommunications[1-0]	0.5376324	0.322162	1.67	0.0979
whattypesystemsdevice[1-0]	-0.95668	0.498509	-1.92	0.0575
whattypecomponentCASE[1-0]	1.6829661	0.670483	2.51	0.0135
whattypecomponentOS[1-0]	0.7354449	0.522281	1.41	0.1618
whattypeenterprisemanufact[1-0]	-1.296506	0.722184	-1.80	0.0753
whattypeenterpriseOES[1-0]	1.4062458	0.99723	1.41	0.1612
whatprocessrequirements[1-0]	-0.514651	0.30854	-1.67	0.0981
whatprocesscoding[1-0]	0.4059629	0.34056	1.19	0.2357
whatprocessfielding[1-0]	-0.932423	0.416234	-2.24	0.0270
whatprocessCM[1-0]	0.9130692	0.35509	2.57	0.0114
whatproductscustom[1-0]	-0.510465	0.280727	-1.82	0.0717

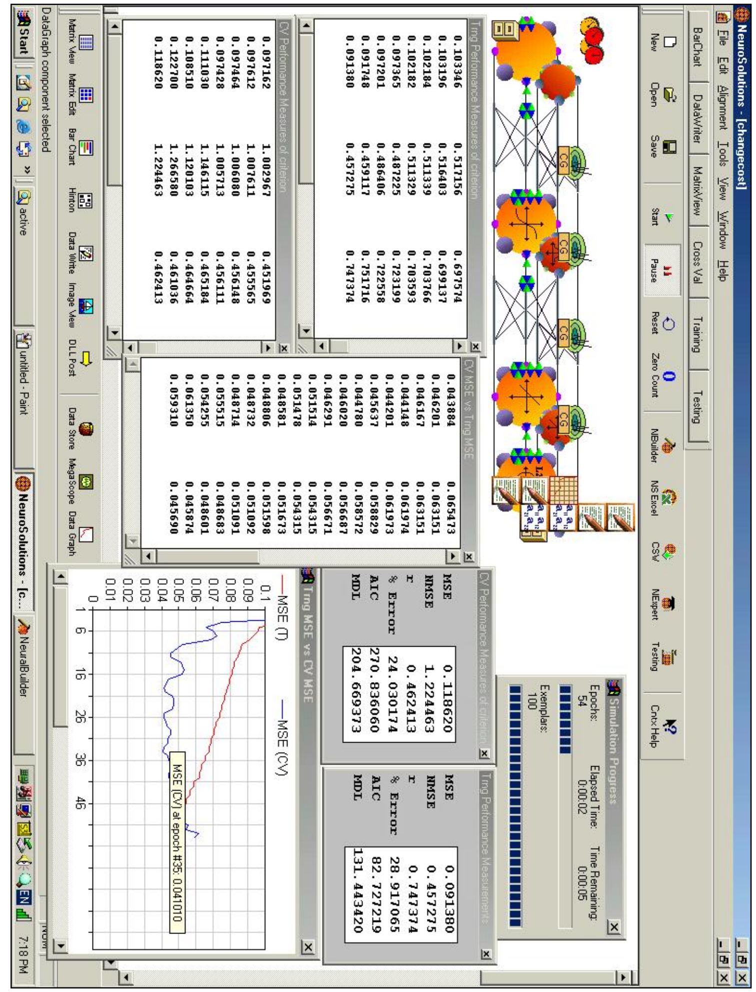
Effect Tests

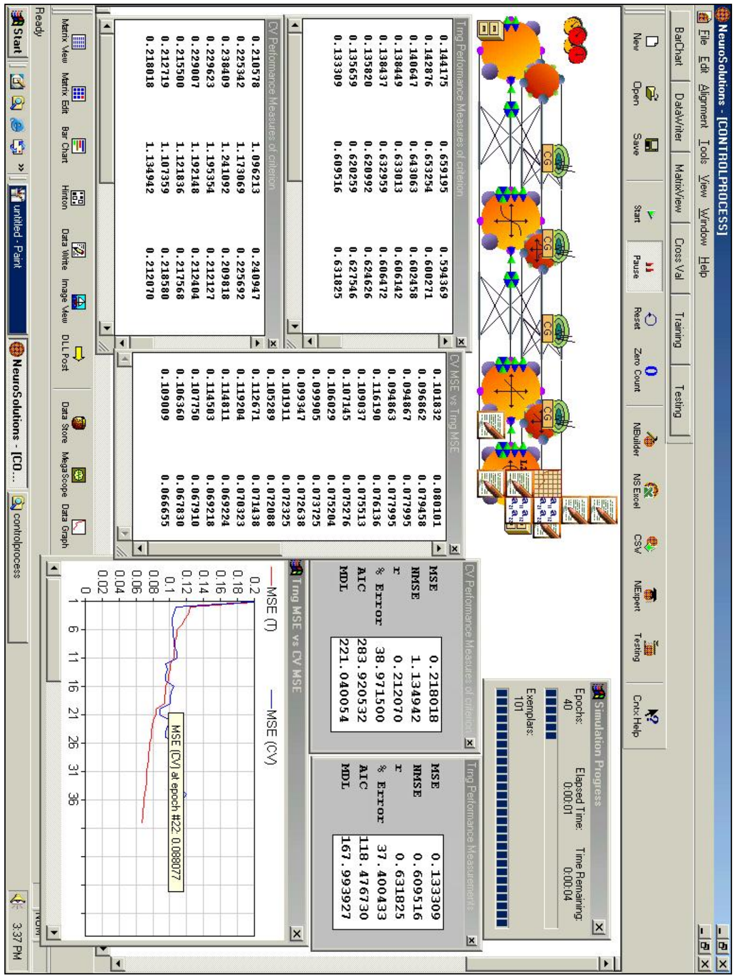
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
whattypesystemscommunications	1	1	5.275968	2.7850	0.0979
whattypesystemsdevice	1	1	6.976999	3.6829	0.0575
whattypecomponentCASE	1	1	11.935924	6.3005	0.0135
whattypecomponentOS	1	1	3.756402	1.9829	0.1618
whattypeenterprisemanufact	1	1	6.105685	3.2230	0.0753
whattypeenterpriseOES	1	1	3.767142	1.9885	0.1612
whatprocessrequirements	1	1	5.270874	2.7823	0.0981
whatprocesscoding	1	1	2.691950	1.4210	0.2357
whatprocessfielding	1	1	9.506730	5.0182	0.0270
whatprocessCM	1	1	12.525974	6.6120	0.0114
whatproductscustom	1	1	6.263891	3.3065	0.0717

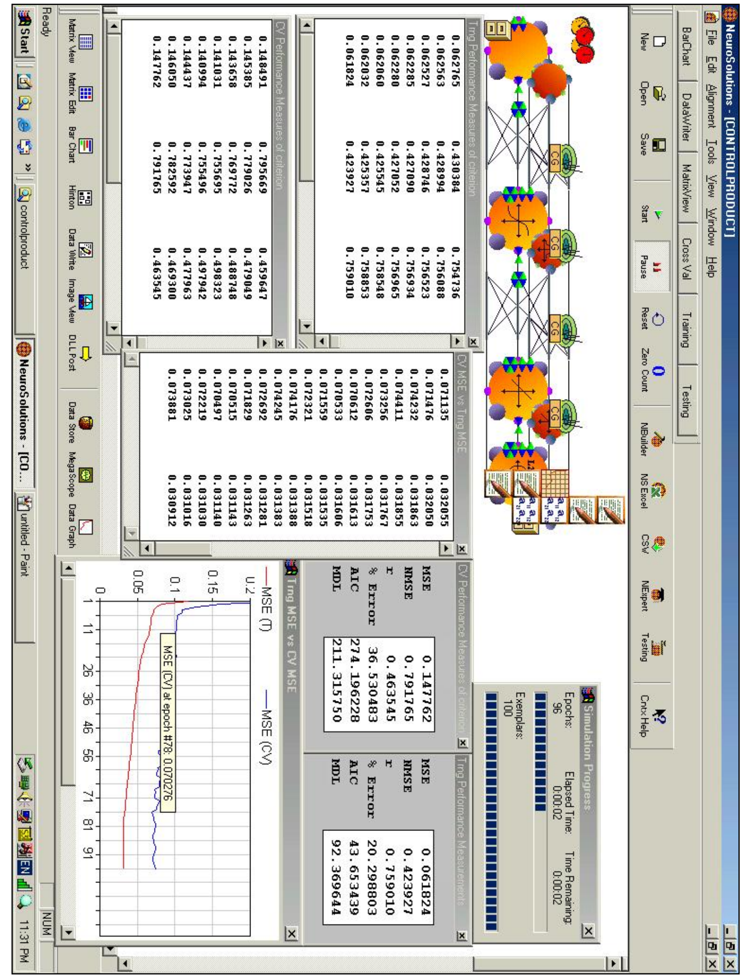
ResponseOrg = 4.21 + sys-comm(0.54) + sys-dev(-0.96) + comp-CASE(1.68) + comp-OS(0.74) + ent-mnft(-1.30) + ent-OES(1.41) + proc-req(-0.51) + proc-coding(0.41) + proc-field(-0.93) + proc-CM(0.91) + prod-cust(-0.51)

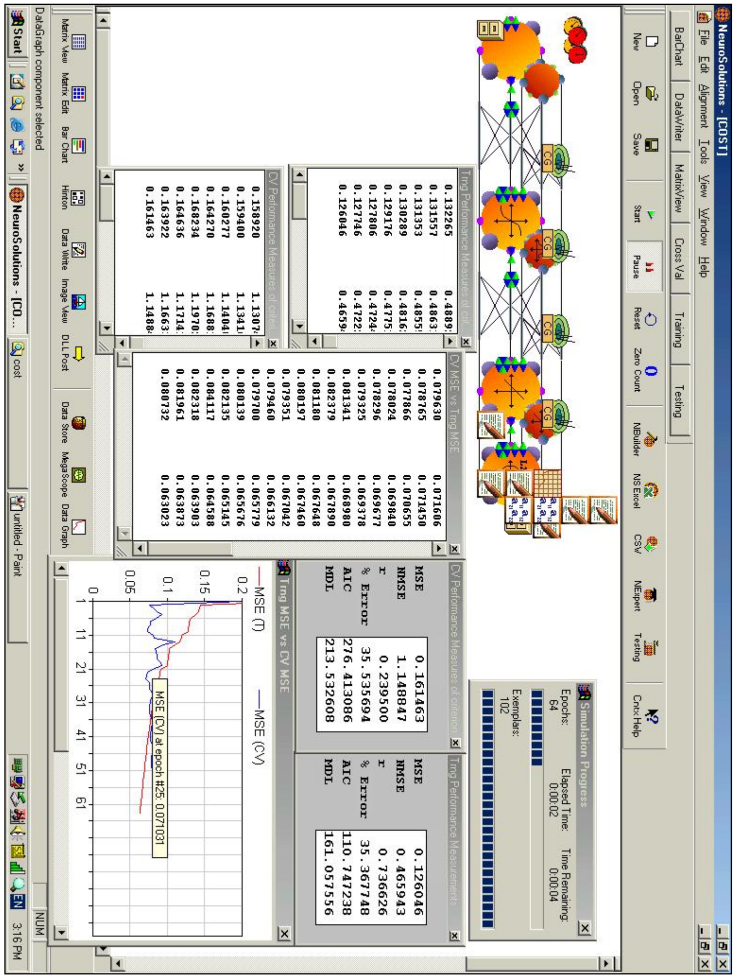
Appendix E - Cross Validation Neurosolution's Screen Shots

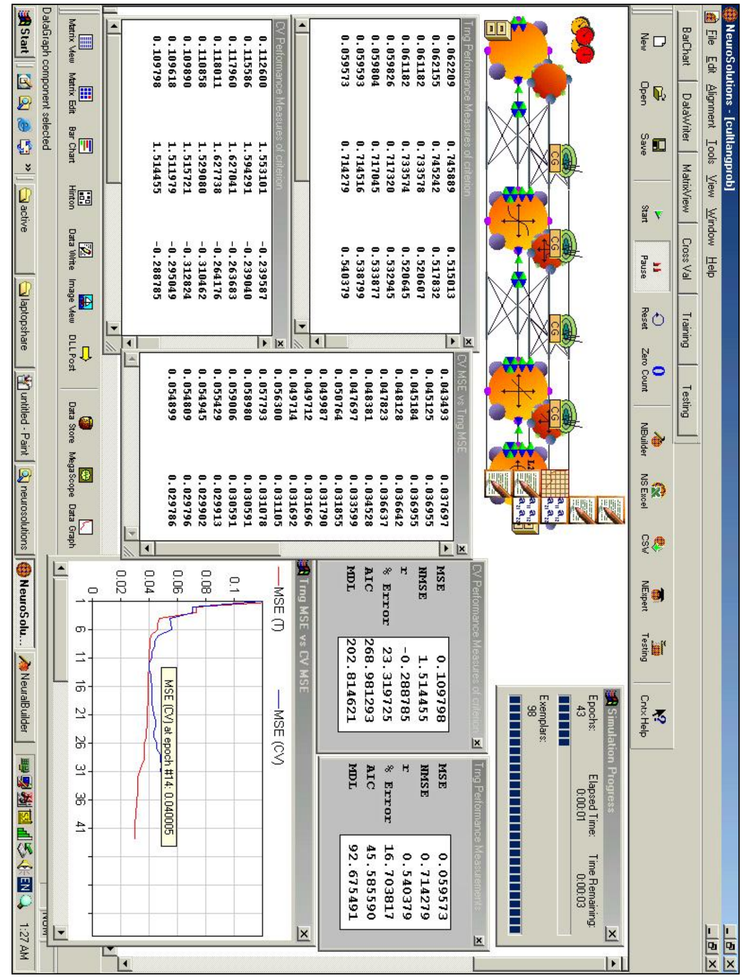


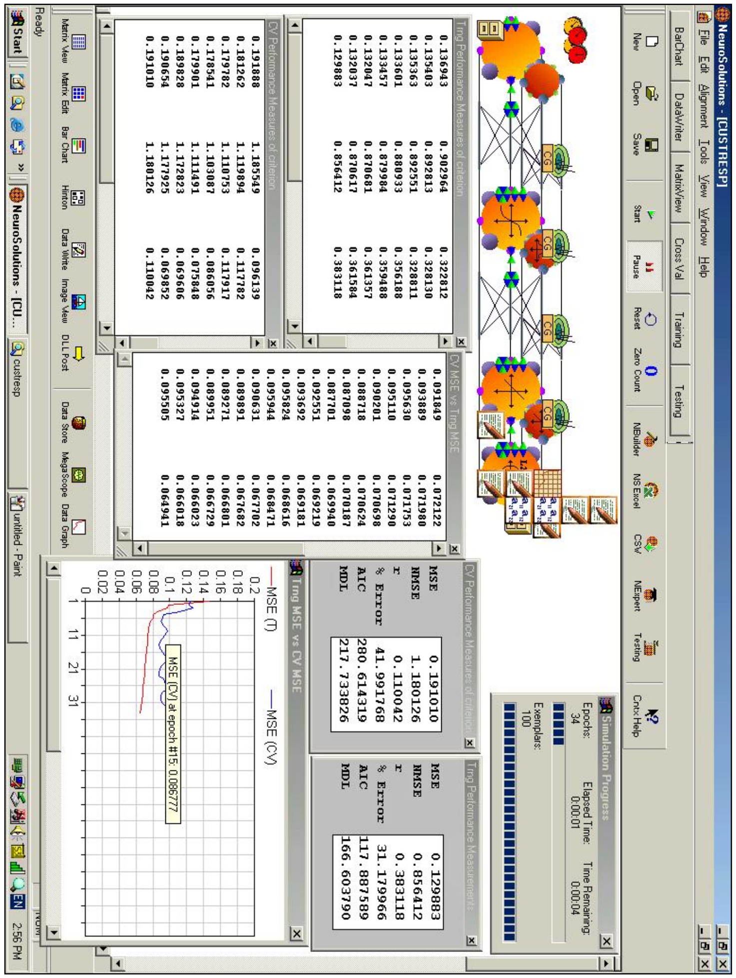


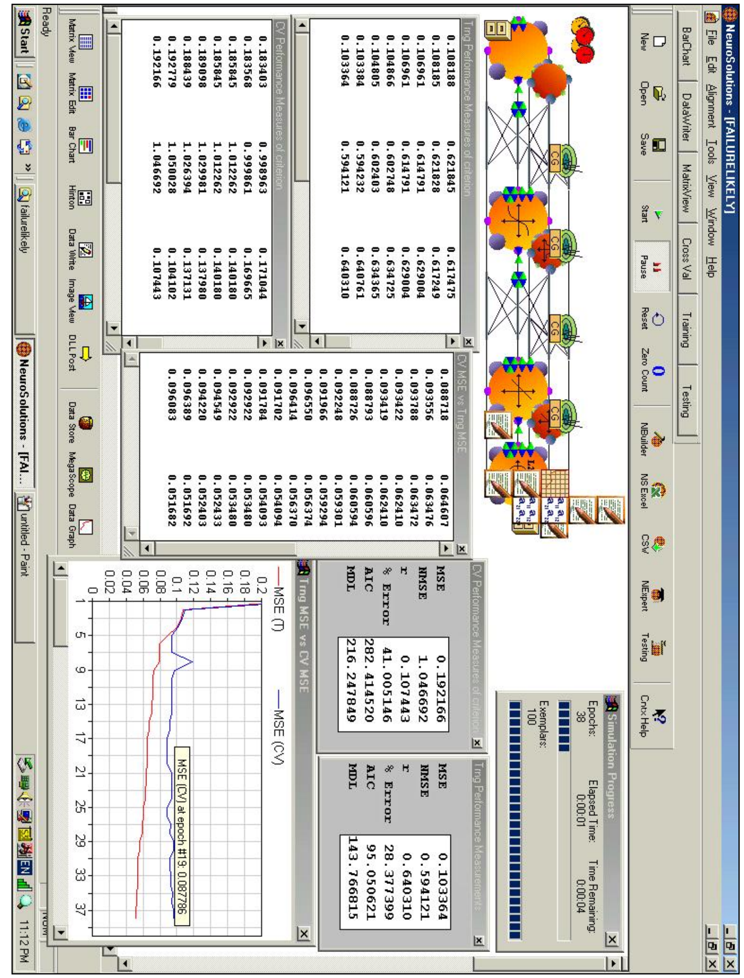

NeuroSolutions - [CONTROLPROCESS]

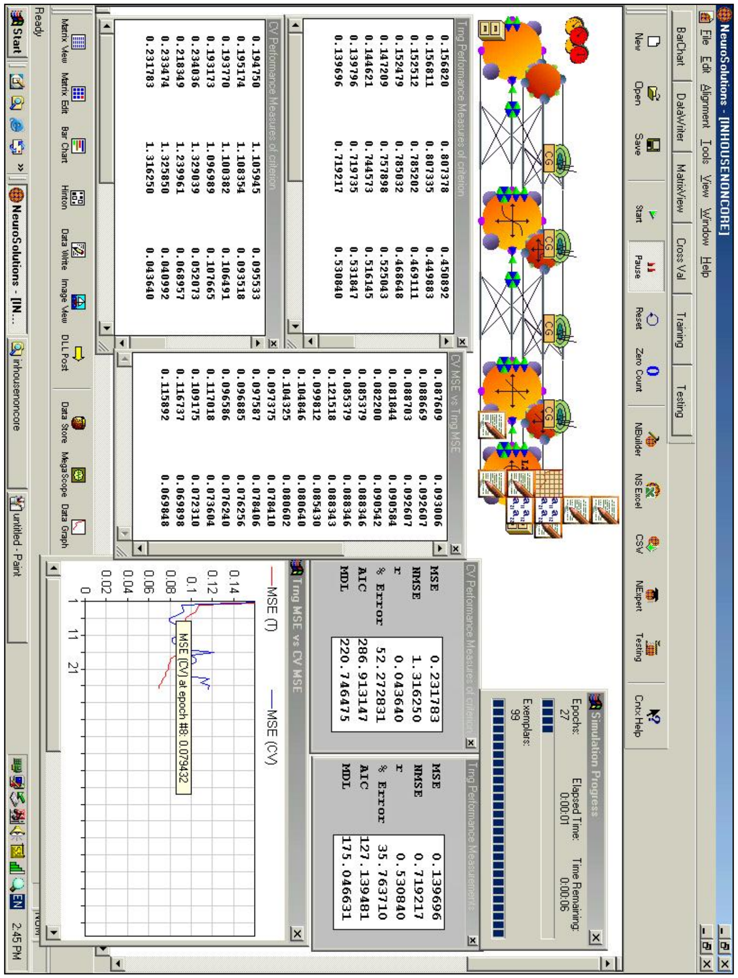

NeuroSolutions - [CONTROLPRODUCT]

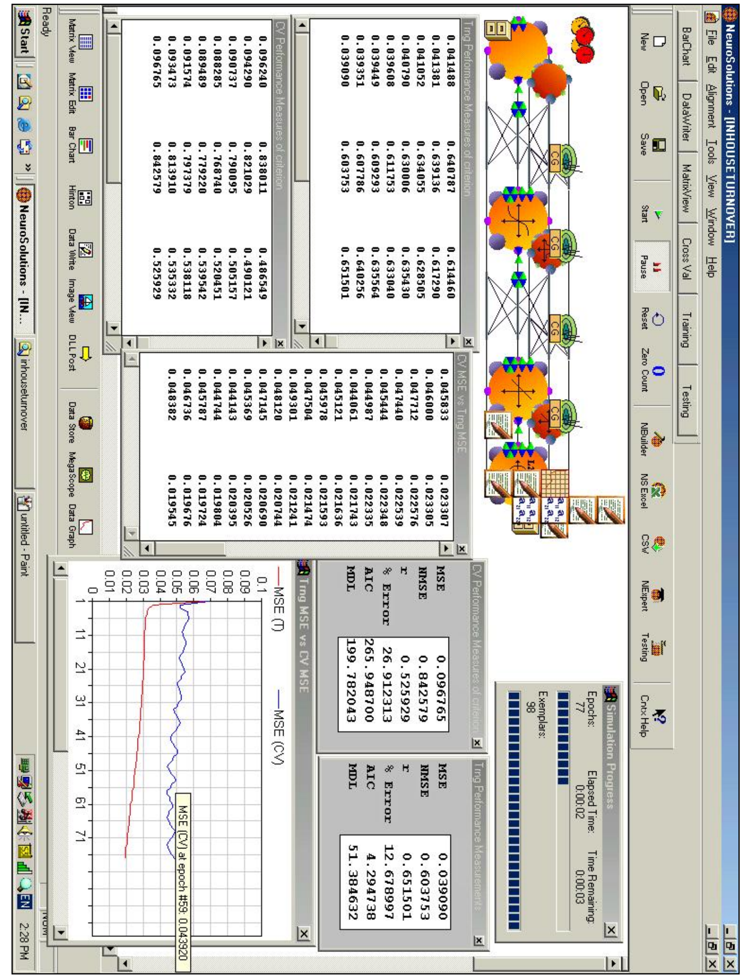

NeuroSolutions - [COST]

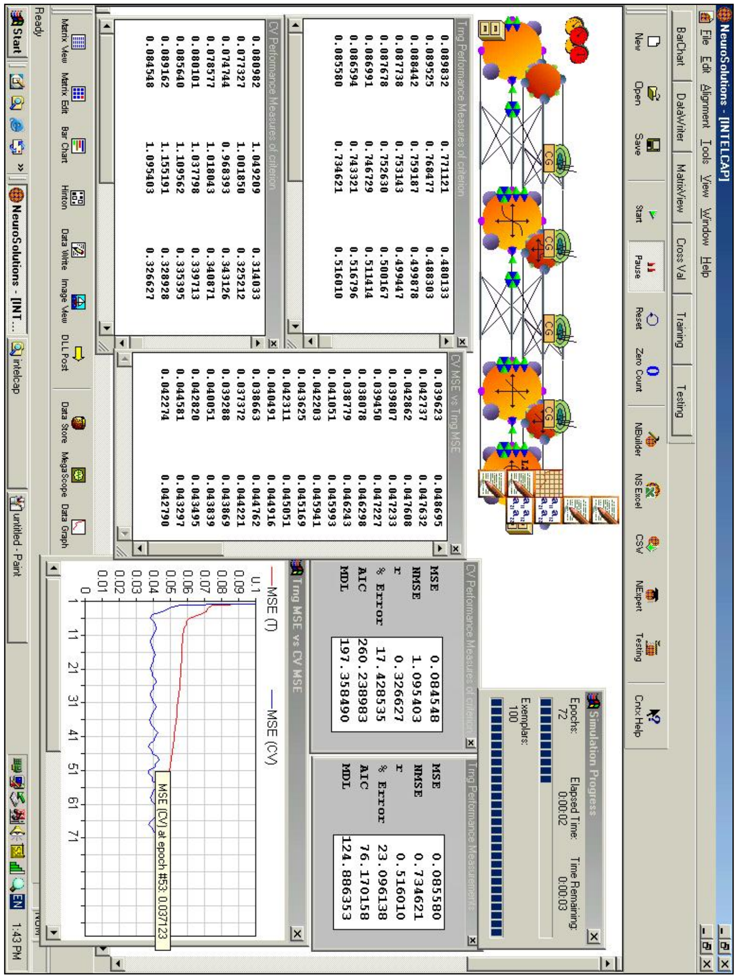

NeuroSolutions - [cultlangprob]

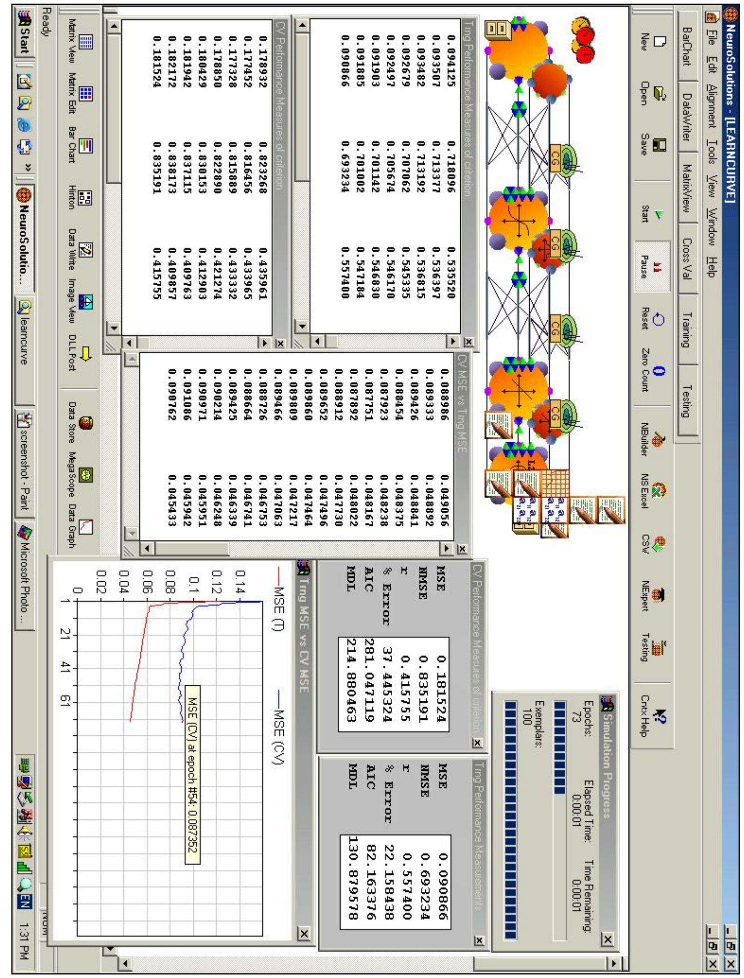

NeuroSolutions - [CUSTRESP]

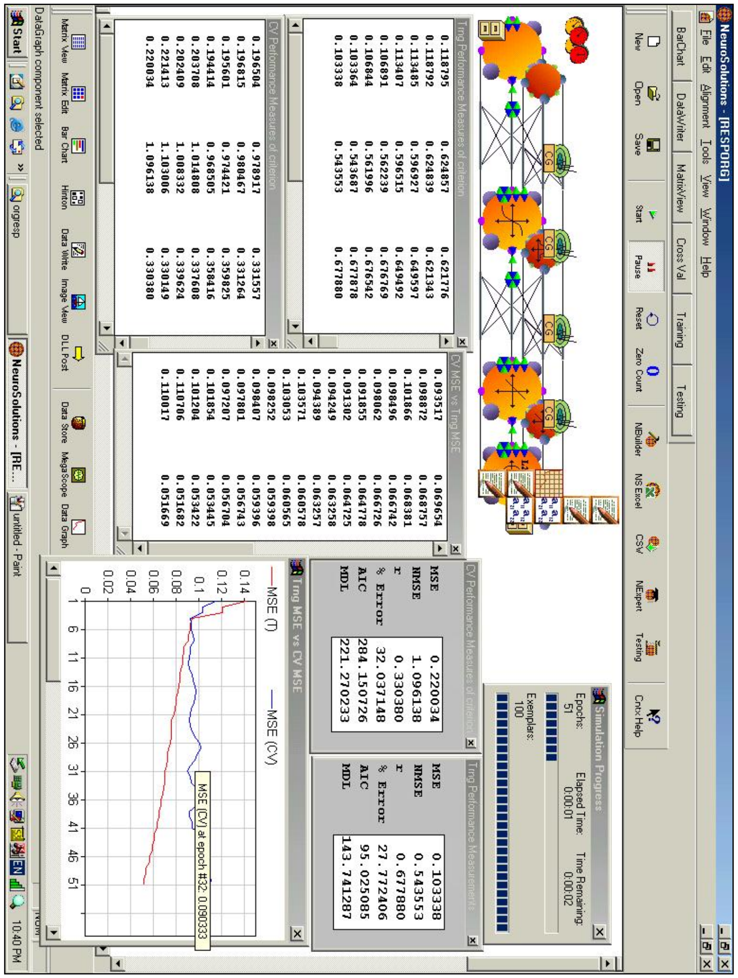

NeuroSolutions - [FAILURELIKELY]

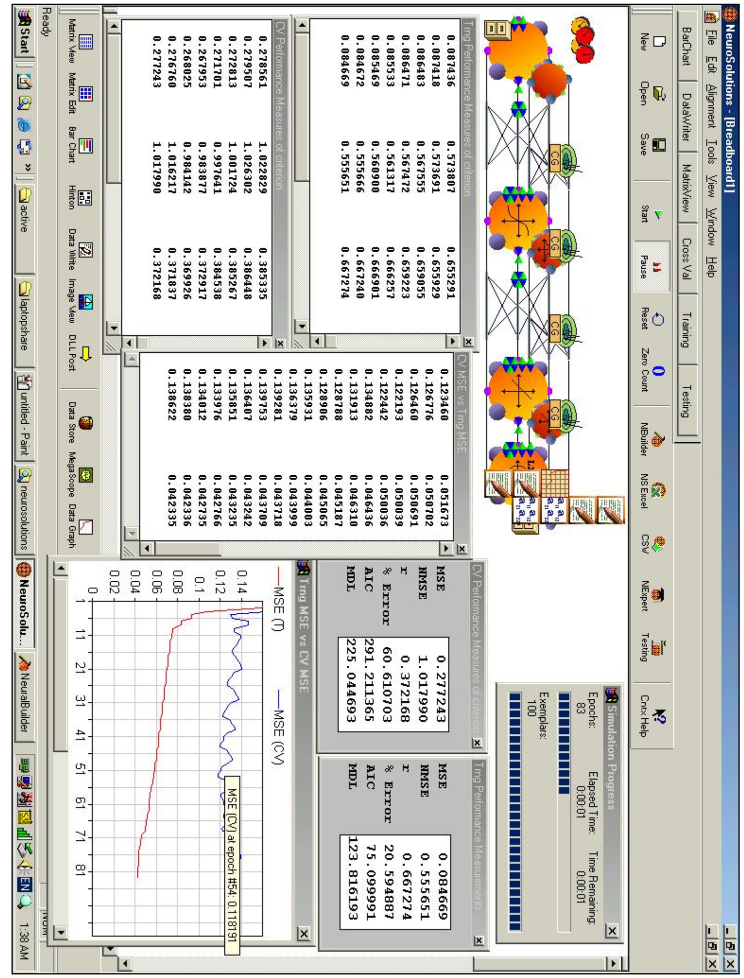

NeuroSolutions - [INHOUSENONCORE]
CV Performance Measures of criterion
MSE 0.231783
RMSE 1.316250
r 0.043640
% Error 52.272831
AIC 286.913147
MDL 220.746475
Trng Performance Measurements
MSE 0.139696
RMSE 0.719217
r 0.530840
% Error 35.763710
AIC 127.139481
MDL 175.046631
Trng MSE vs CV MSE
MSE (T)
MSE (CV)
MSE (CV) at epoch #8: 0.079432

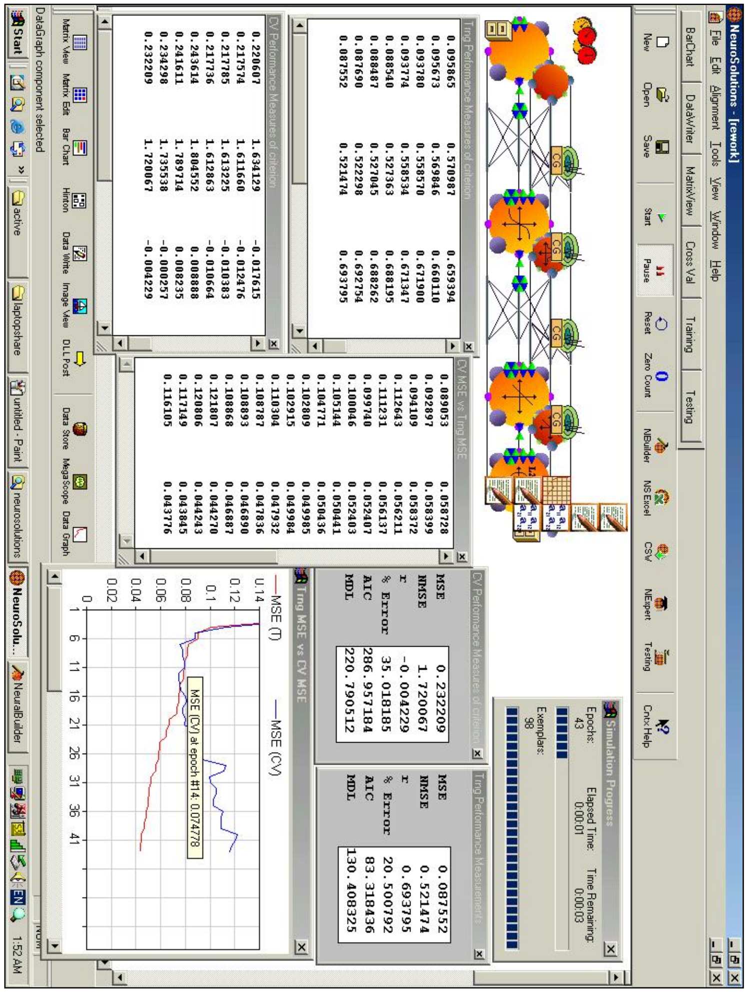

NeuroSolutions - [INHOUSETURNOVER]
CV Performance Measures of criterion
MSE 0.096765
RMSE 0.842579
r 0.525929
% Error 26.912313
AIC 265.948700
MDL 199.782043
Trng Performance Measurements
MSE 0.039090
RMSE 0.603753
r 0.651501
% Error 12.678997
AIC 4.294738
MDL 51.384632
Trng MSE vs CV MSE
MSE (T)
MSE (CV)
MSE (CV) at epoch #59: 0.043920

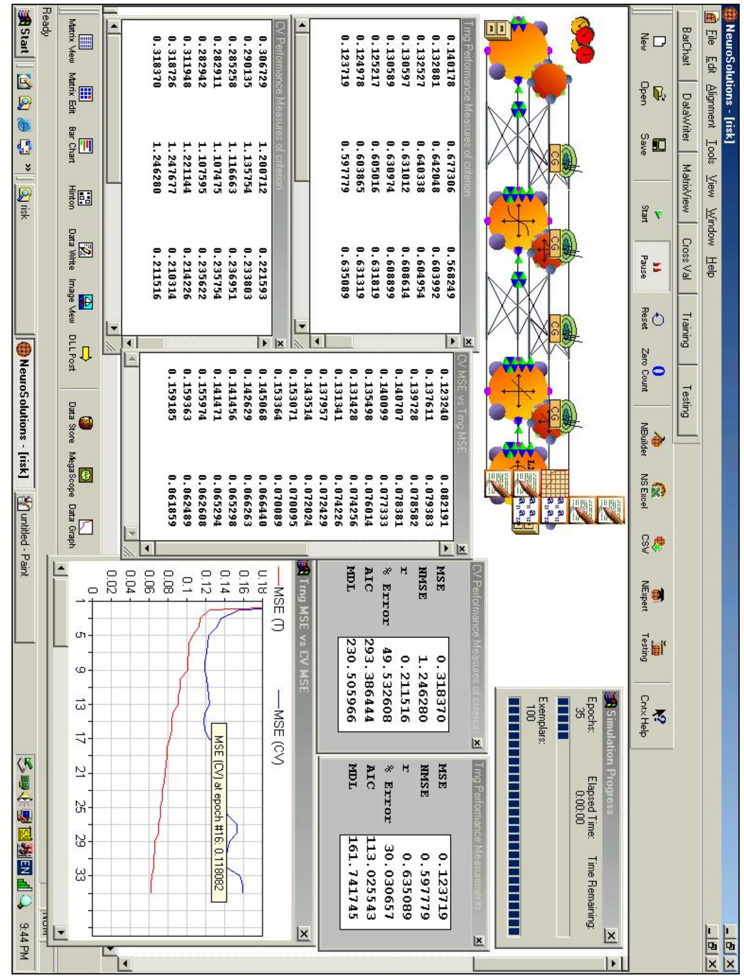


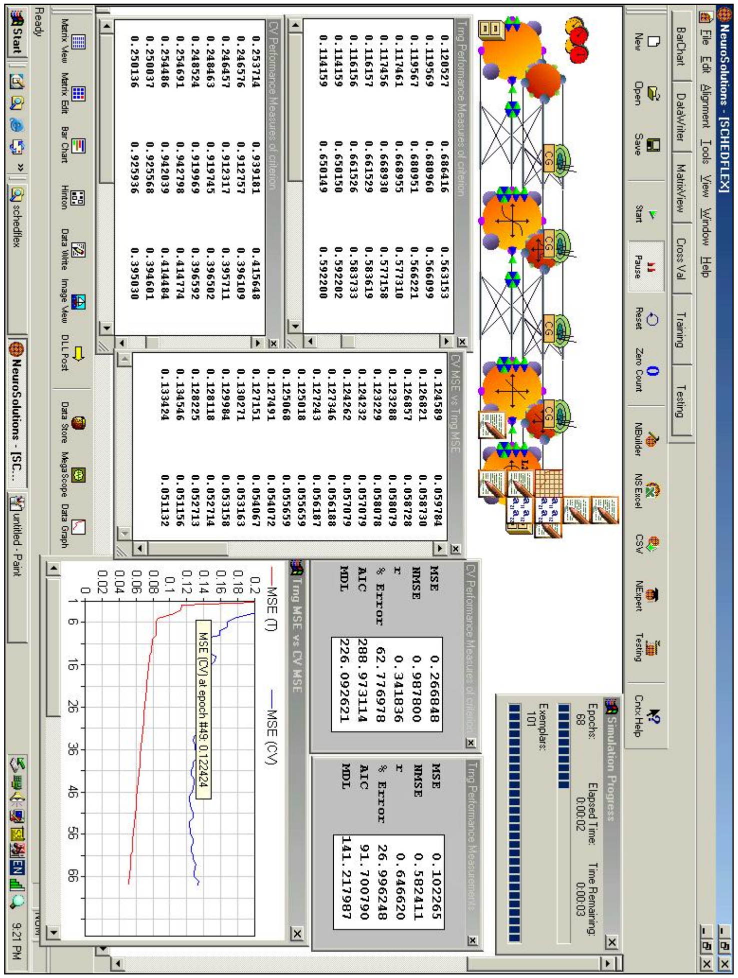


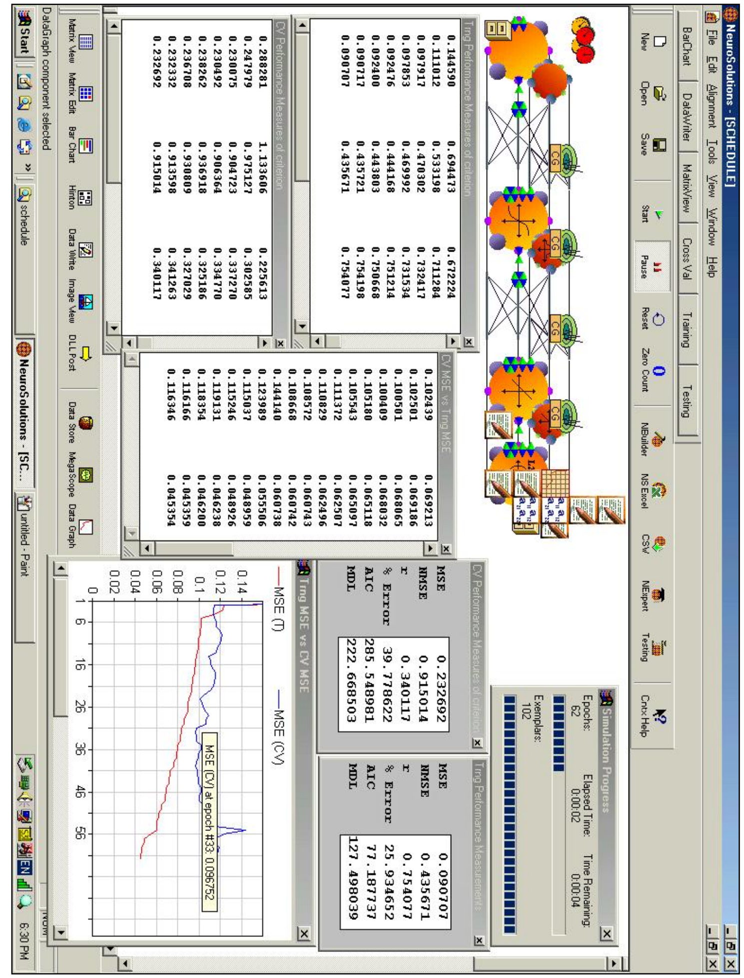

NeuroSolutions - [RESPORG]

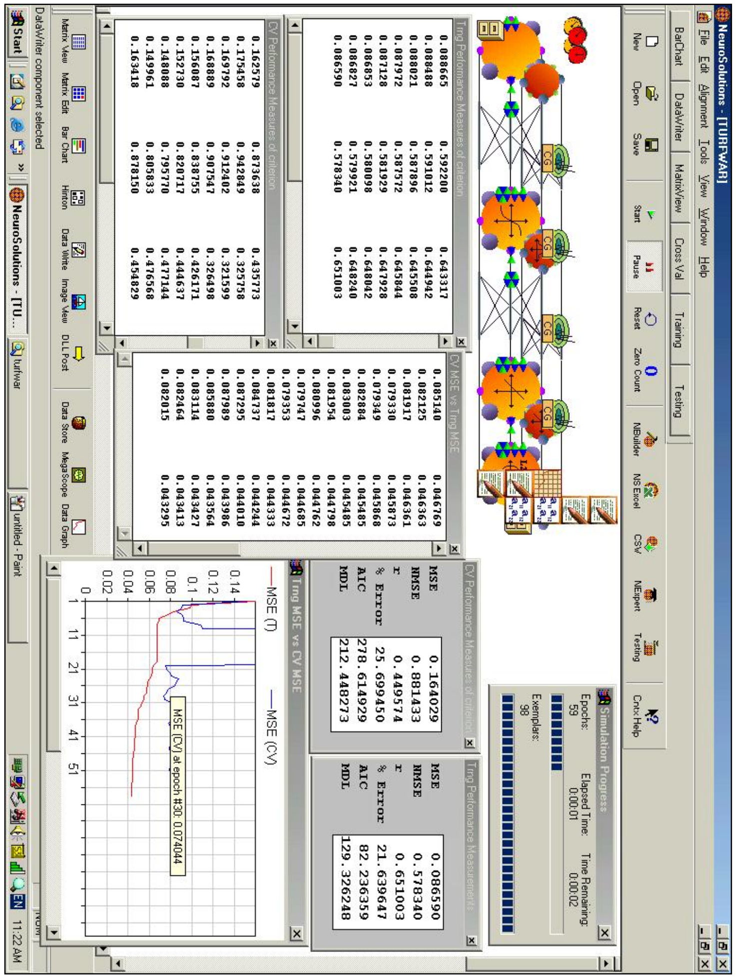

NeuroSolutions - [Breadboard1]

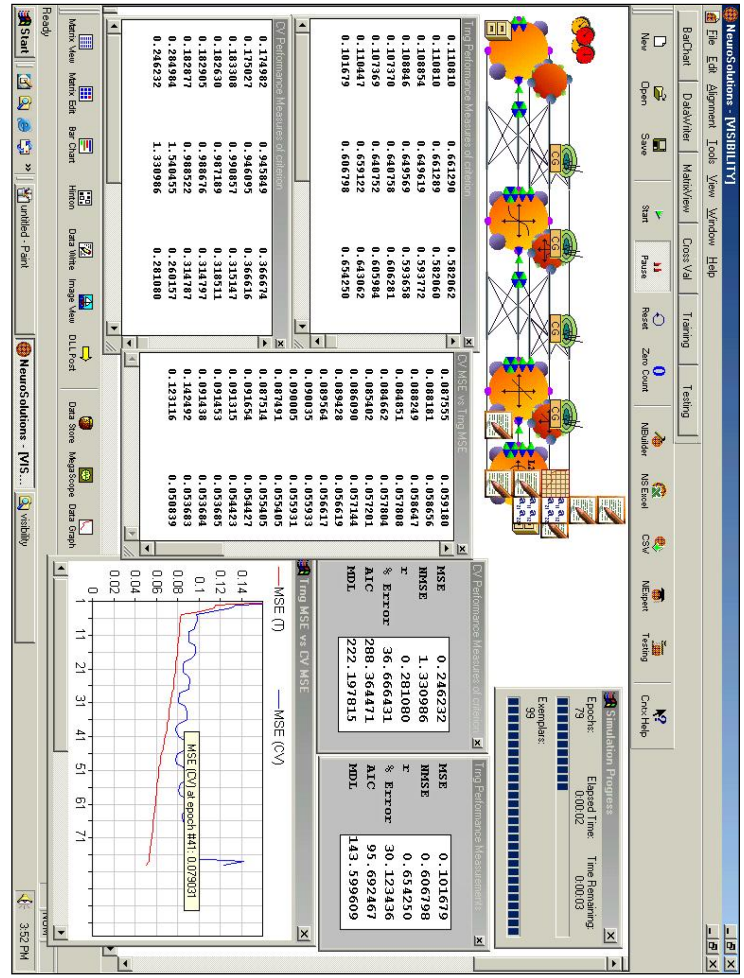

NeuroSolutions - [rework]


NeuroSolutions - [risk]

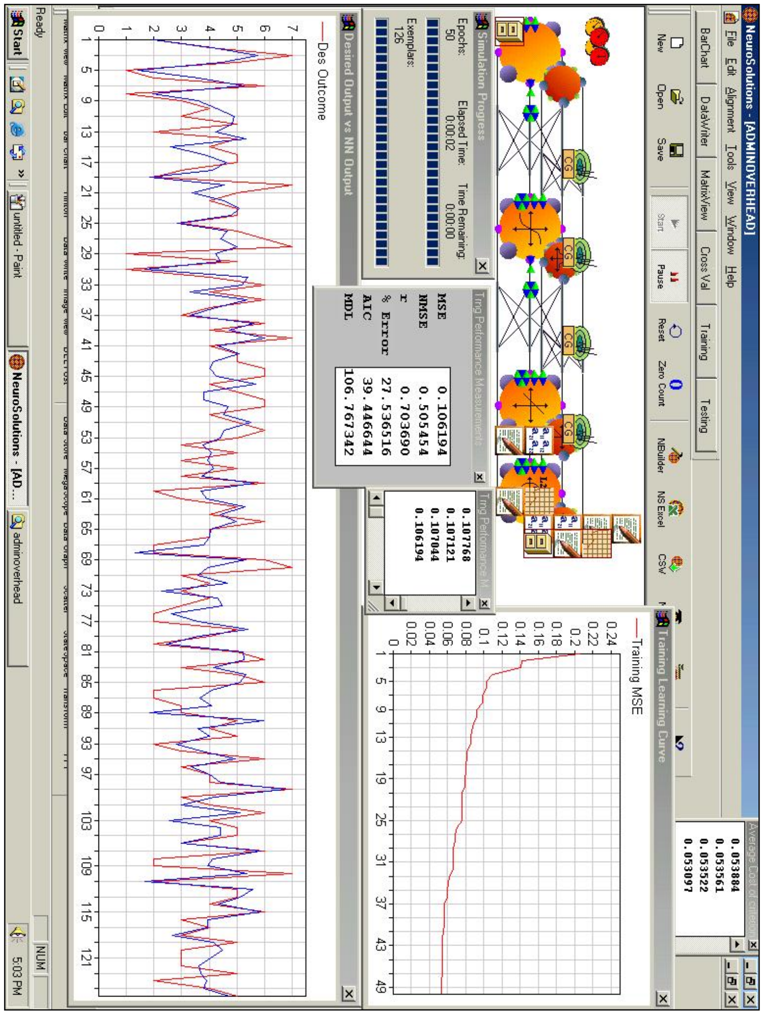

NeuroSolutions - [SCHEDFLEX]

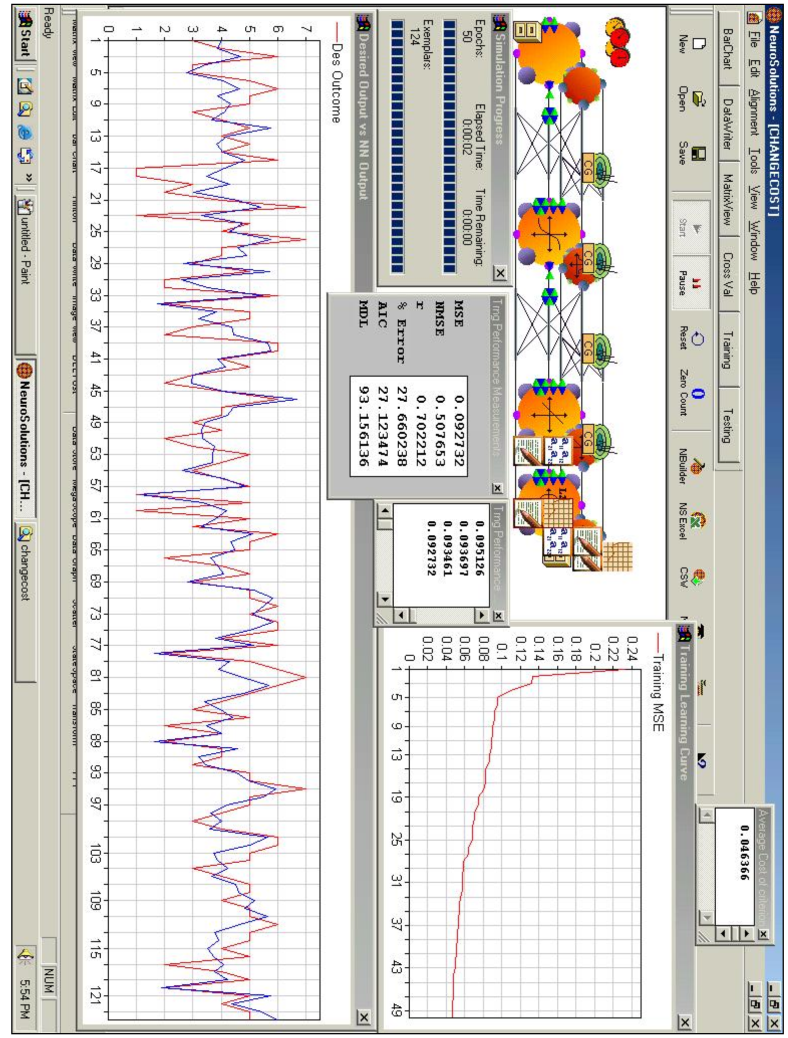

NeuroSolutions - [SCHEDULE]

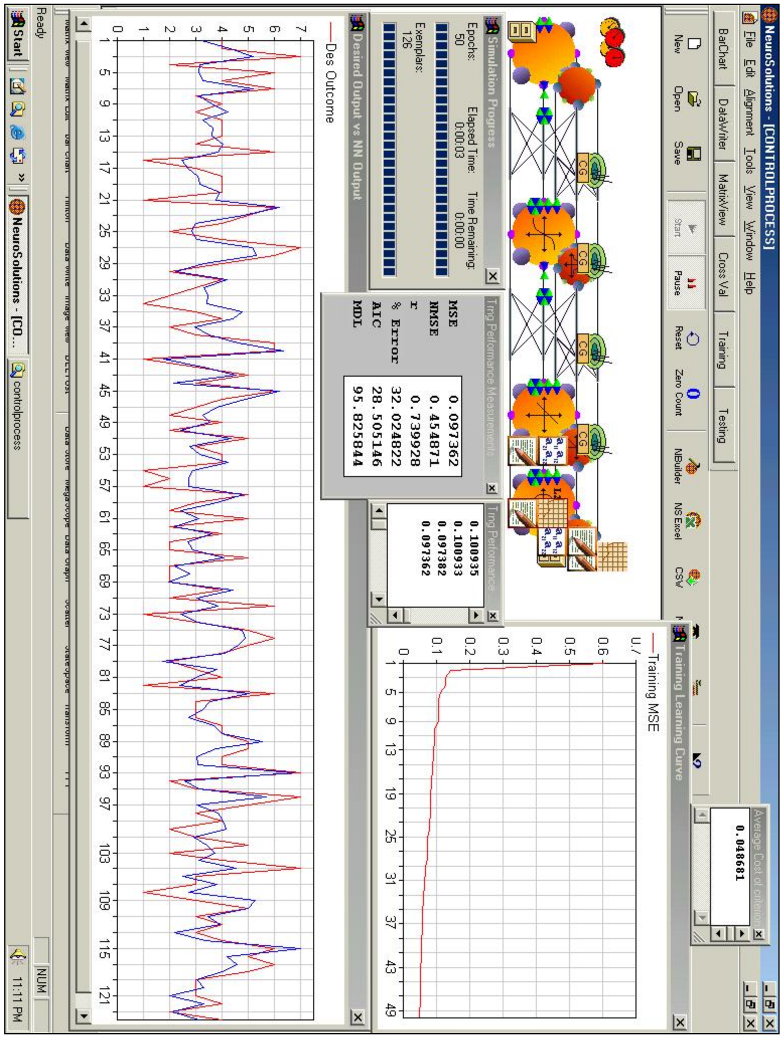

NeuroSolutions - [TURFWAR]

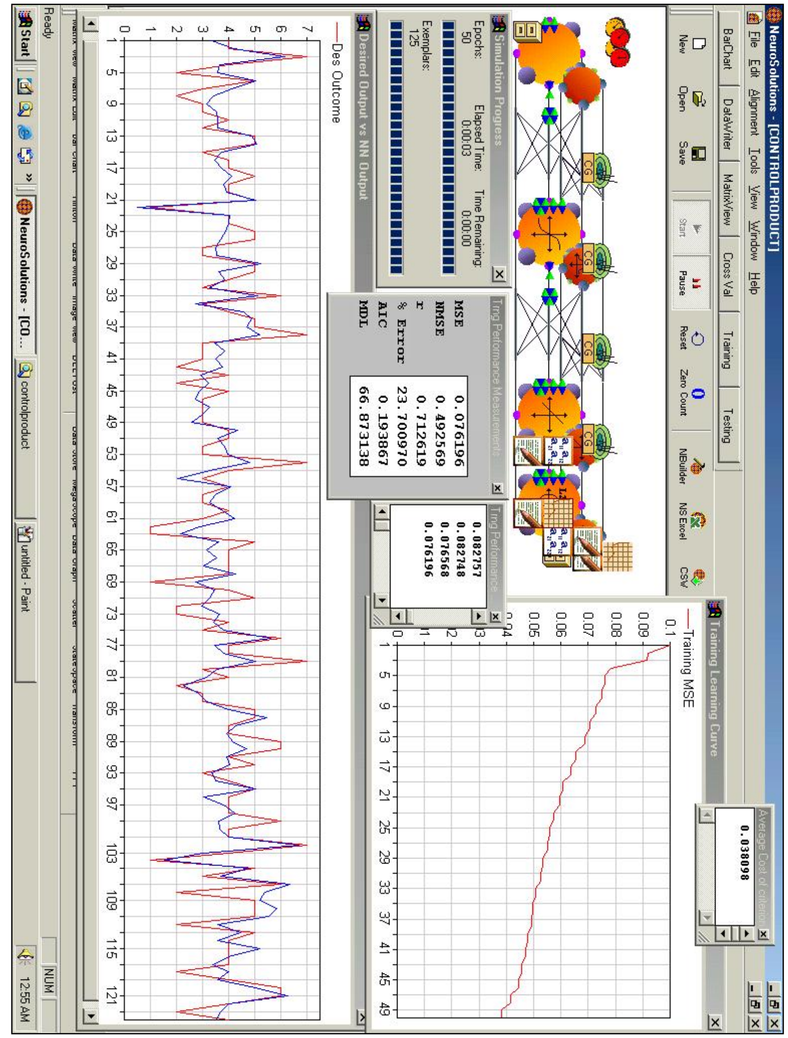

NeuroSolutions - [VISIBILITY]

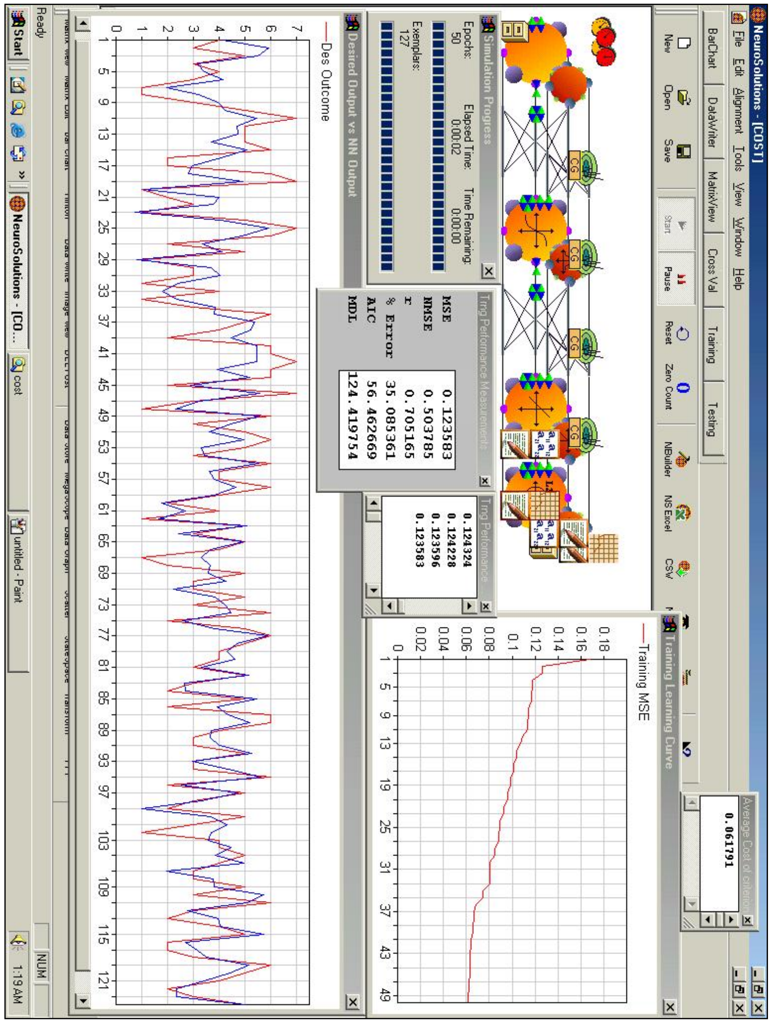
Appendix F - Training Neurosolution's Screen Shots

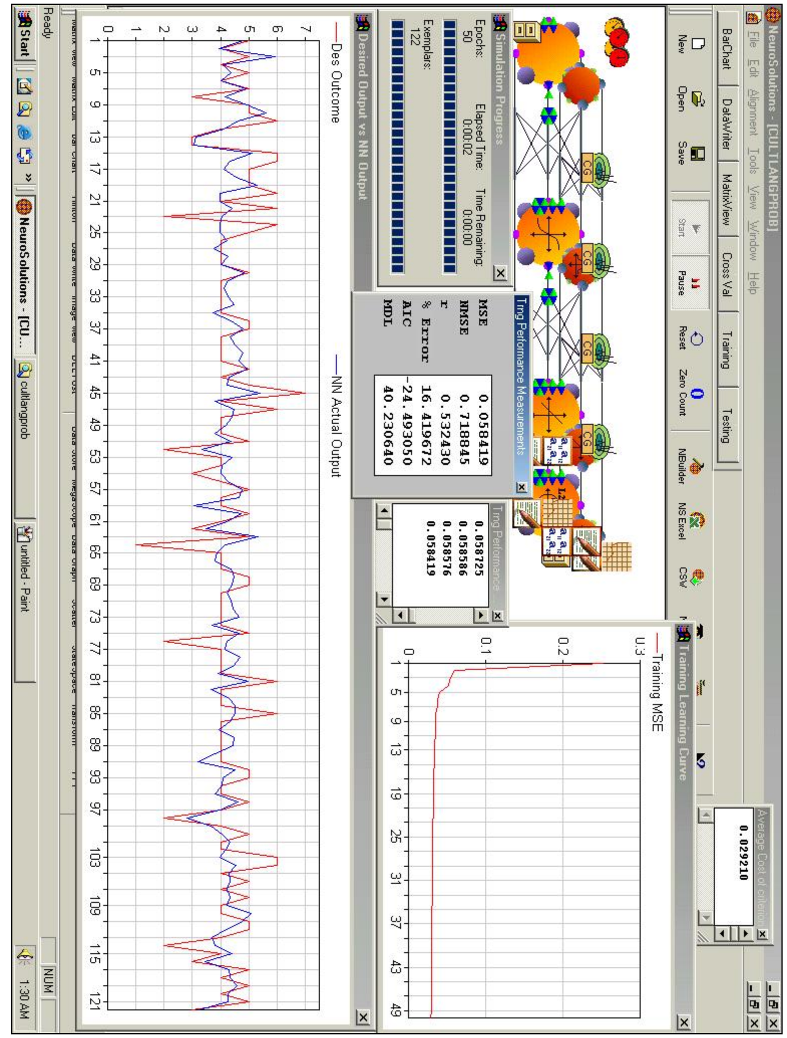


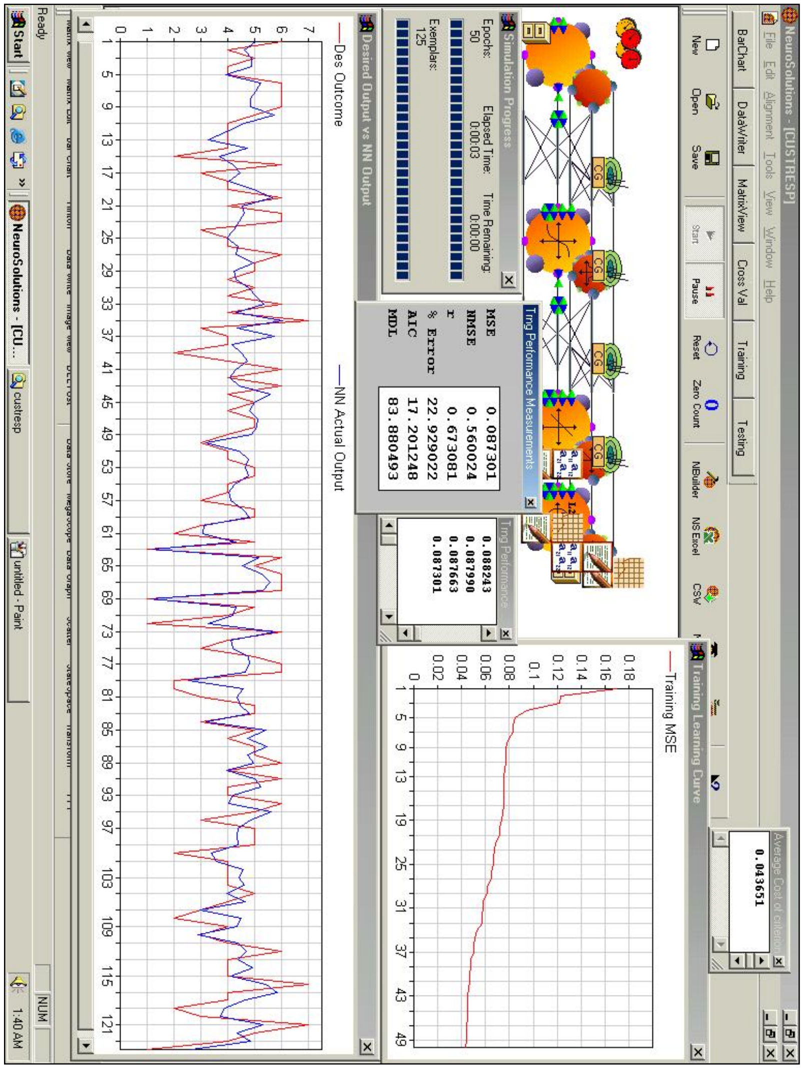


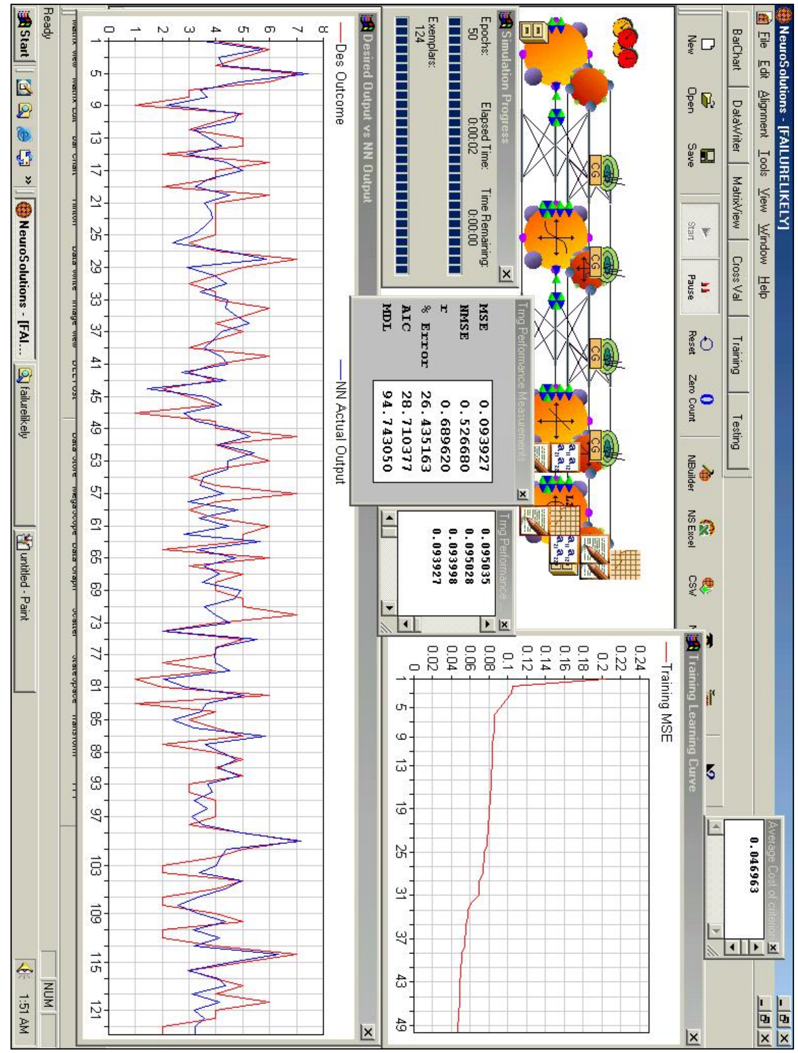

NeuroSolutions - [CONTROLPROCESS]
Simulation Progress
Epochs: 50
Elapsed Time: 0:00:03
Time Remaining: 0:00:00
Exemplars: 126
Trng Performance Measurements
MSE 0.097362
RMSE 0.454871
r 0.739928
% Error 32.024822
AIC 28.505146
MDL 95.825844
Training Learning Curve
Training MSE
Desired Output vs NN Output
Des Outcome
Average Cost of collection
0.048681

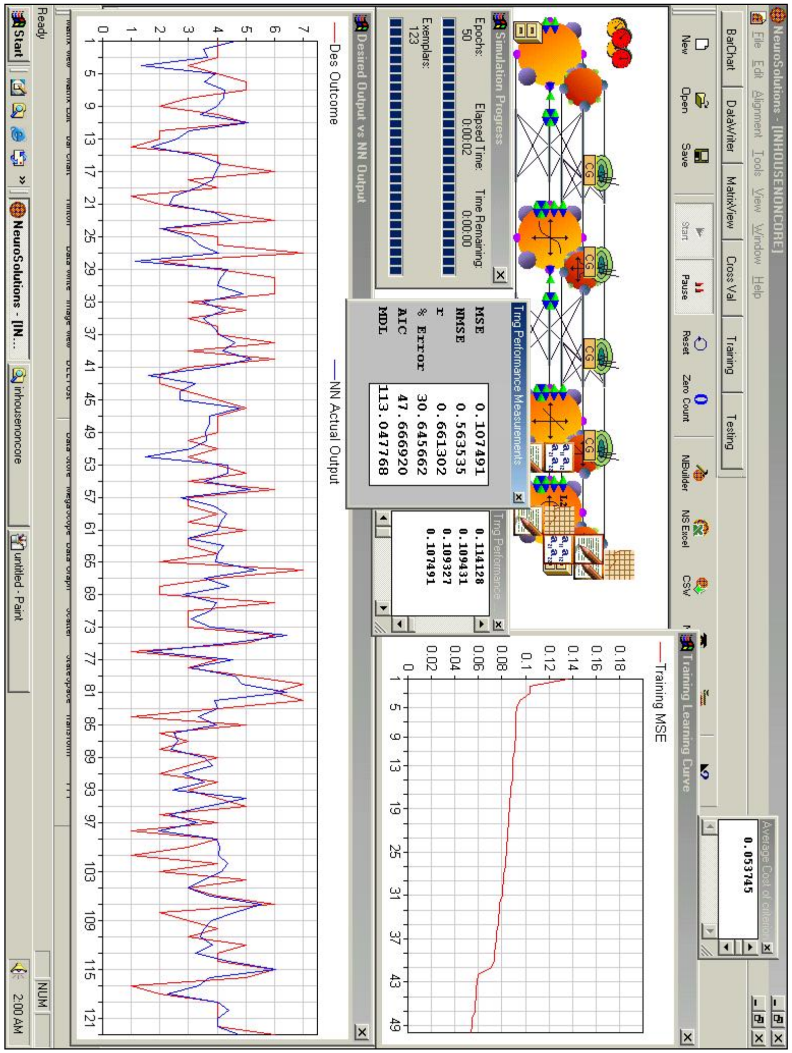

NeuroSolutions - [CONTROLPRODUCT]
Simulation Progress
Epochs: 50
Elapsed Time: 0:00:03
Time Remaining: 0:00:00
Exemplars: 125
Trng Performance Measurements
MSE 0.076196
RMSE 0.492569
r 0.712619
% Error 23.700970
AIC 0.193867
MDL 66.873138
Training Learning Curve
Training MSE
Desired Output vs NN Output
Des Outcome
Average Cost of collection
0.038098

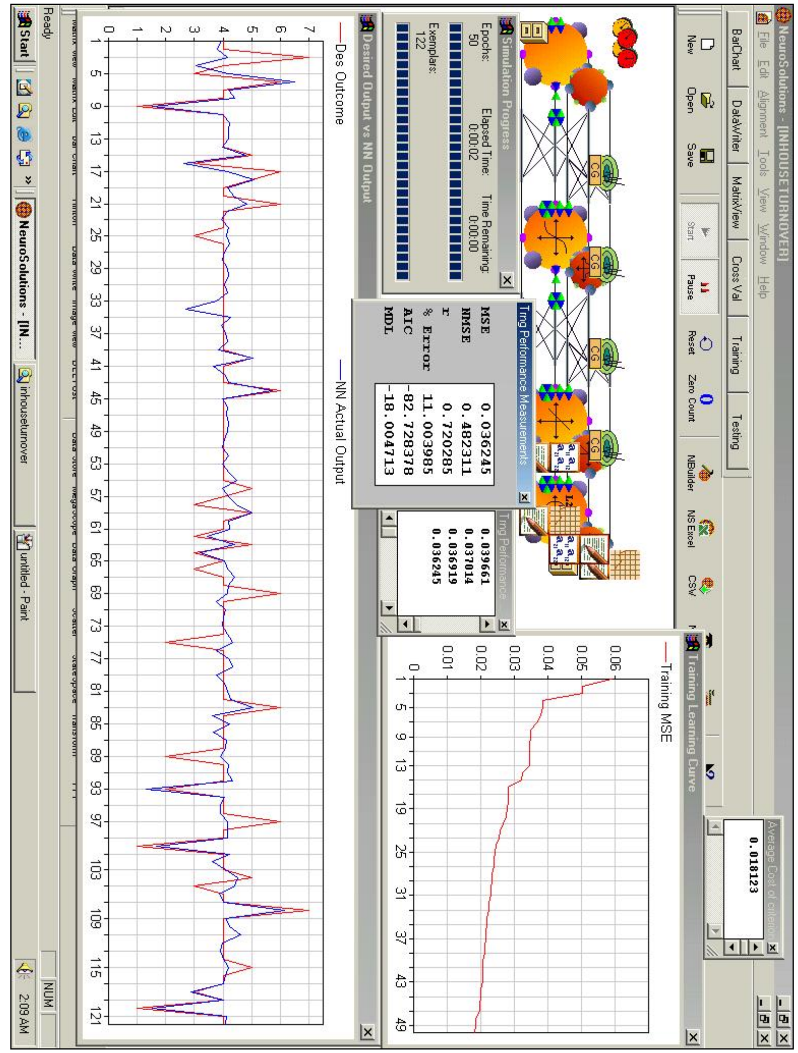

NeuroSolutions - [COST]
Simulation Progress
Trng Performance Measurements
MSE 0.123583
RMSE 0.503785
r 0.705165
% Error 35.085361
AIC 56.462669
MDL 124.419754
Desired Output vs NN Output
Des Outcome
Training Learning Curve
Training MSE
Average Cost of criterion
0.061791

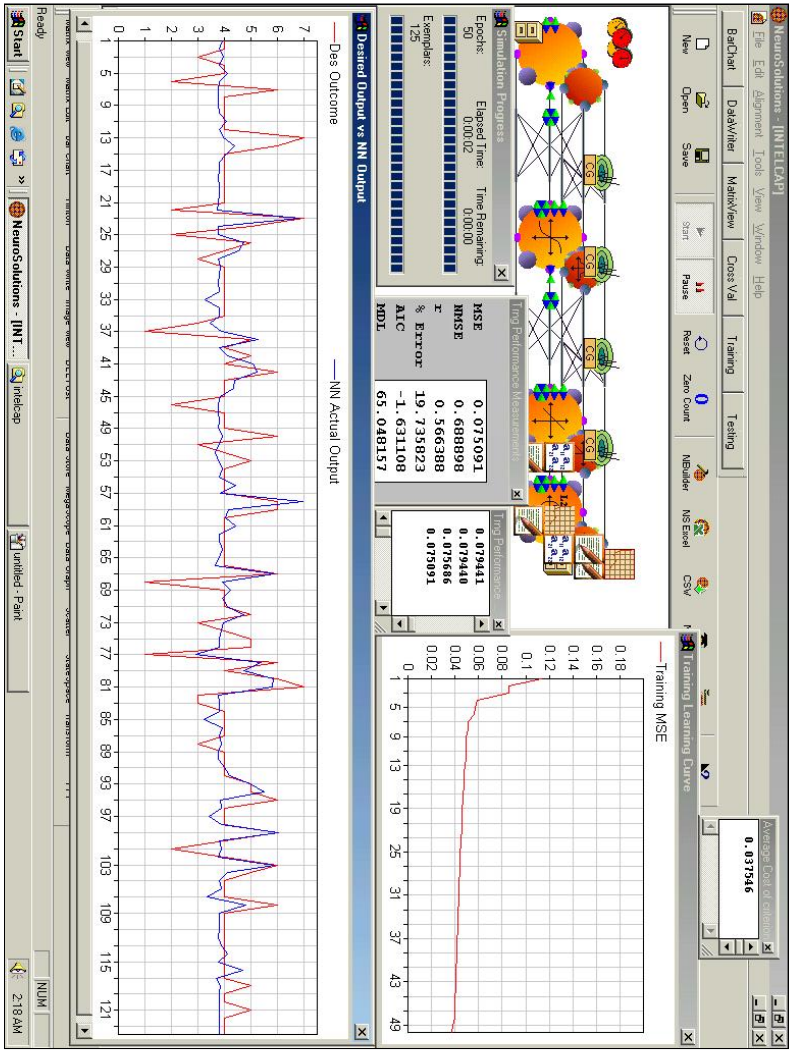

NeuroSolutions - [CULTLANGPROB]
Simulation Progress
Trng Performance Measurements
MSE 0.058419
RMSE 0.718845
r 0.532430
% Error 16.419672
AIC -24.493050
MDL 40.230640
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
Average Cost of criterion
0.029210

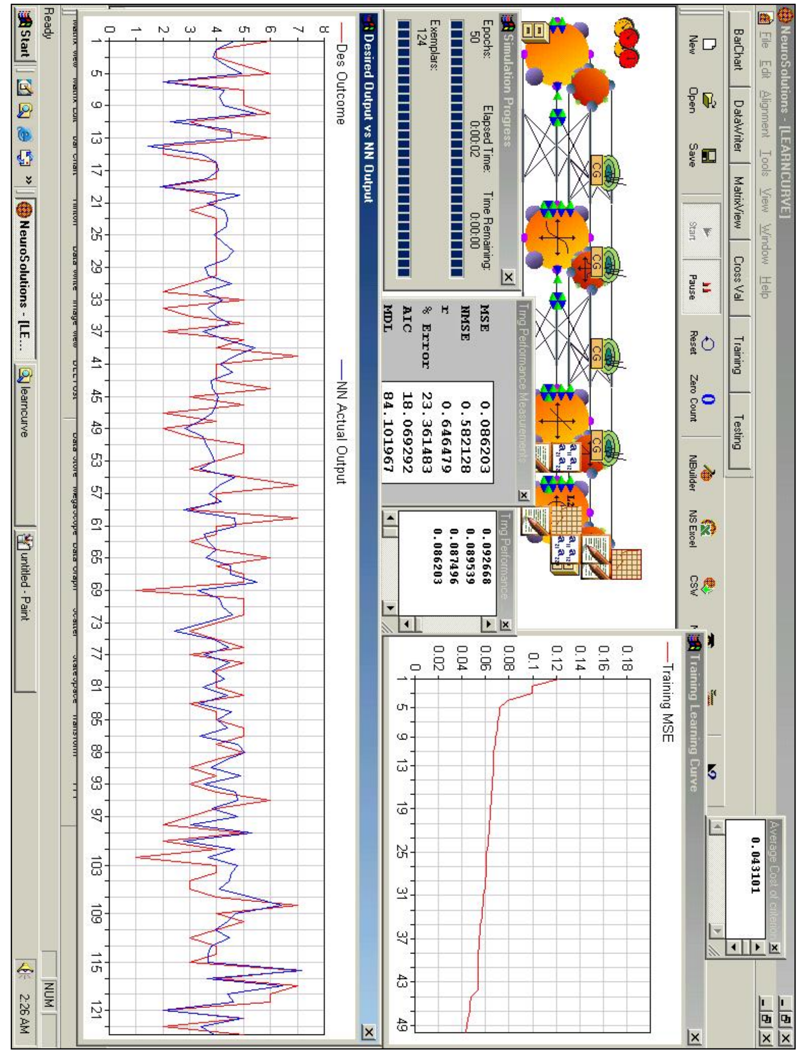

NeuroSolutions - [CUSTRESP]
Simulation Progress
Desired Output vs NN Output
Des Outcome
NN Actual Output
Trng Performance Measurements
MSE 0.087301
NMSE 0.560024
r 0.673081
% Error 22.929022
AIC 17.201248
MDL 83.880493
Training Learning Curve
Training MSE
Average Cost of cu
0.043651

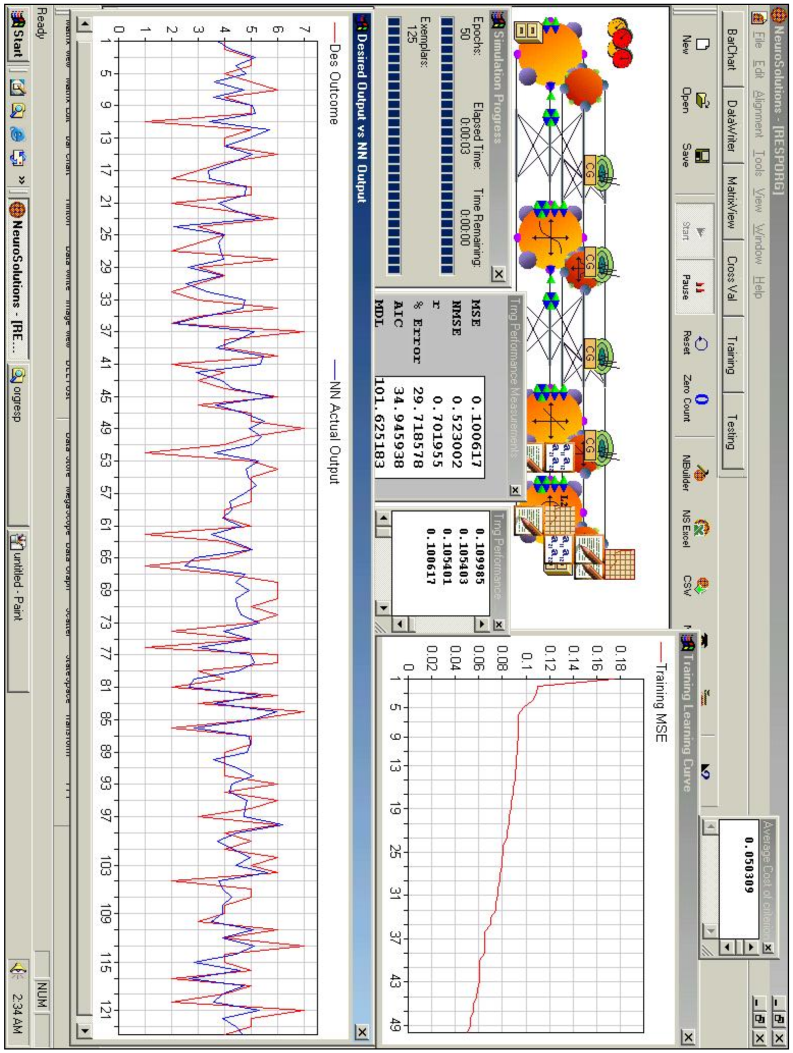

NeuroSolutions - [FAILURELIKELY]
Simulation Progress
Desired Output vs NN Output
Des Outcome
NN Actual Output
Trng Performance Measurements
MSE 0.093927
NMSE 0.526680
r 0.689620
% Error 26.435163
AIC 28.710377
MDL 94.743050
Training Learning Curve
Training MSE
0.046963

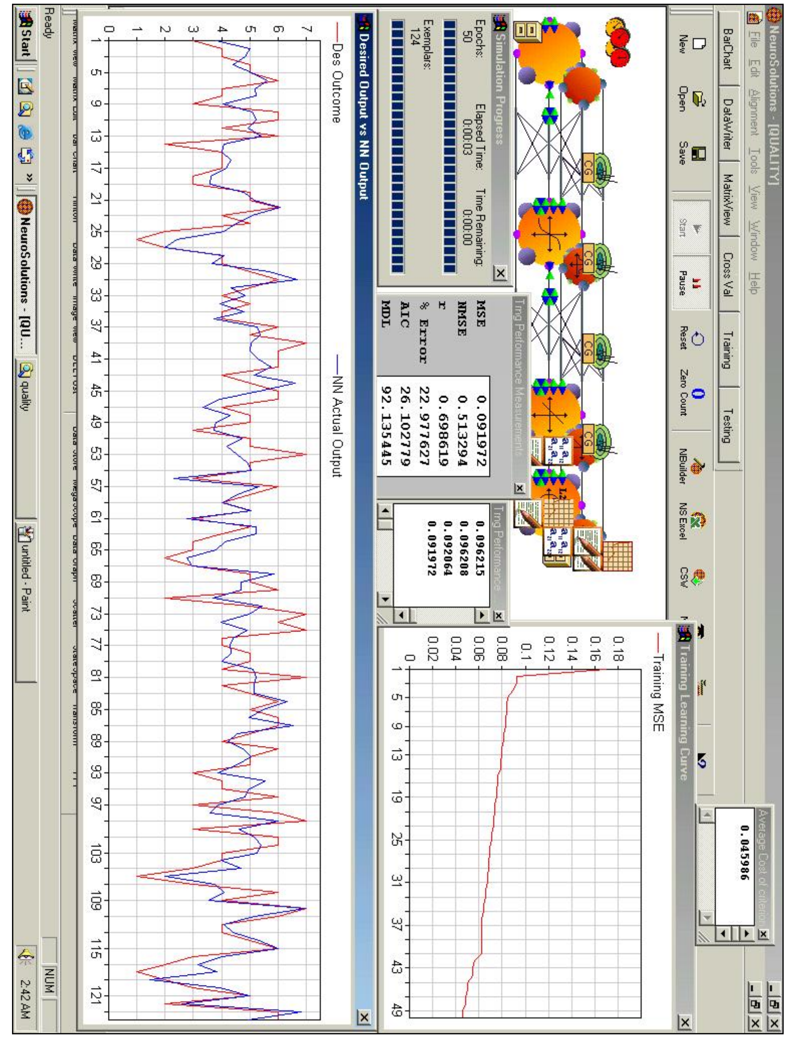

NeuroSolutions - [INHOUSENONCORE]
Simulation Progress
Epochs: 50
Exemplars: 123
Trng Performance Measurements
MSE 0.107491
NMSE 0.563535
r 0.661302
% Error 30.645662
AIC 47.666920
MDL 113.047768
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
Average Cost of criterion
0.053745

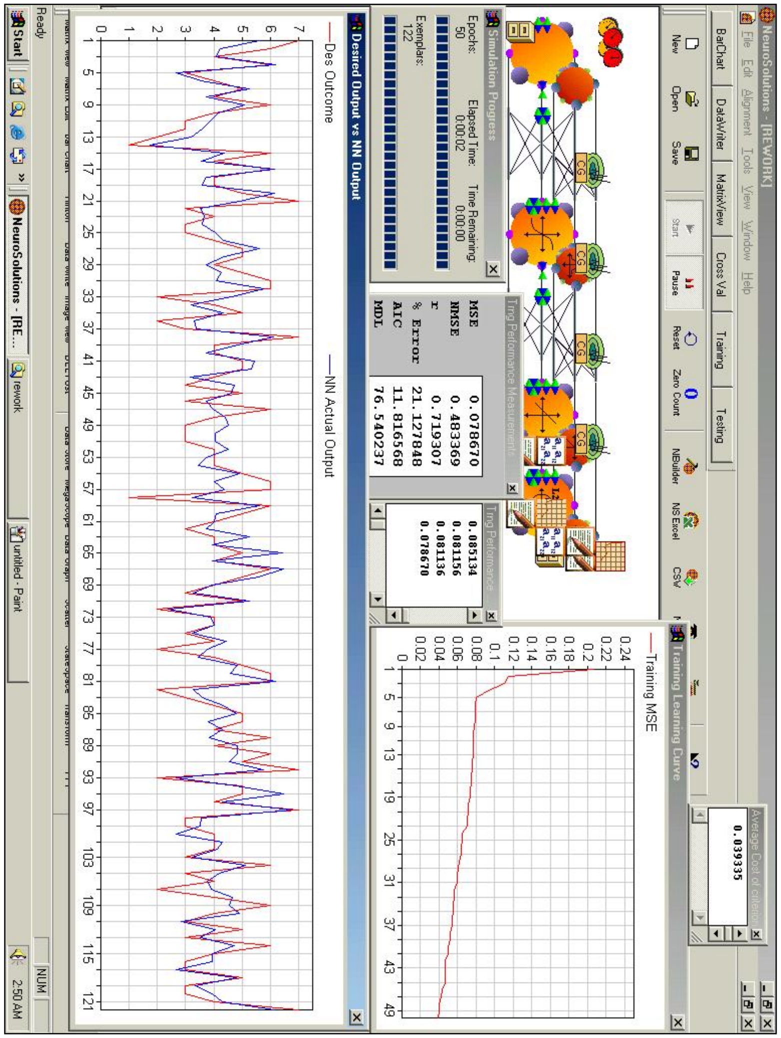

NeuroSolutions - [INHOUSETURNOVER]
Simulation Progress
Epochs: 50
Exemplars: 122
Trng Performance Measurements
MSE 0.036245
NMSE 0.482311
r 0.720285
% Error 11.003985
AIC -82.728378
MDL -18.004713
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
Average Cost of criterion
0.018123

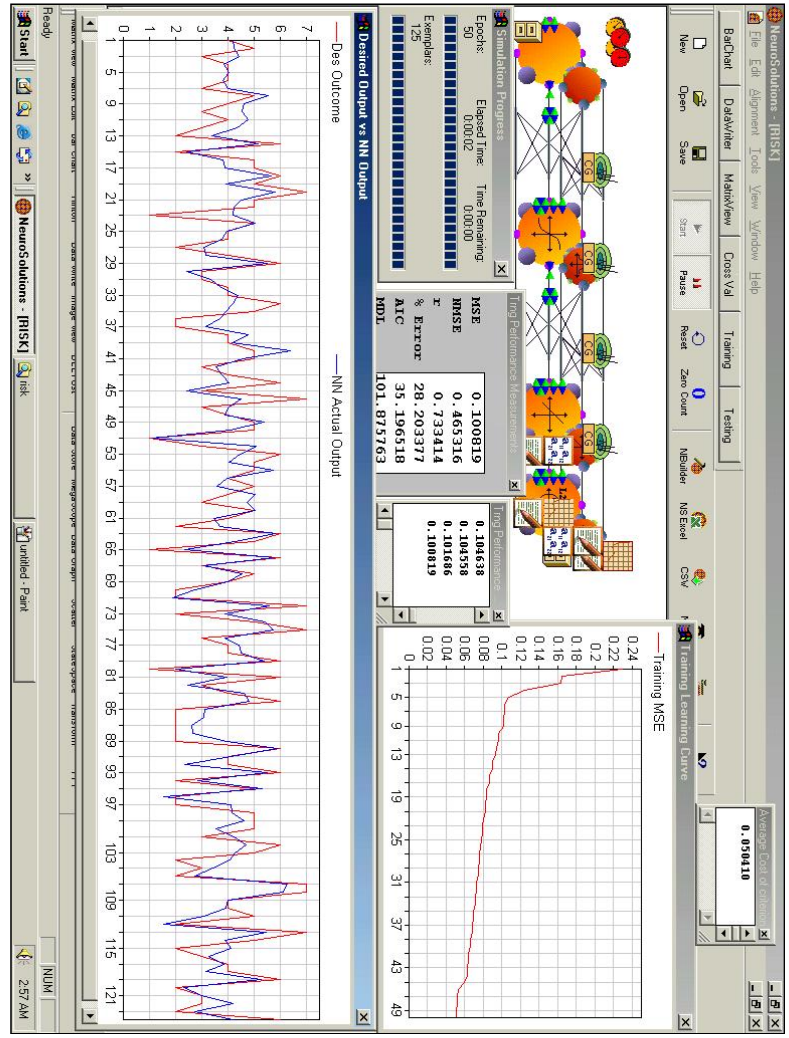

NeuroSolutions - [INTELCAP]
Simulation Progress
Desired Output vs NN Output
Des Outcome
NN Actual Output
MSE 0.075091
NMSE 0.688898
r 0.566388
% Error 19.735823
AIC -1.631108
MDL 65.048157
Training Learning Curve
Training MSE
0.037546

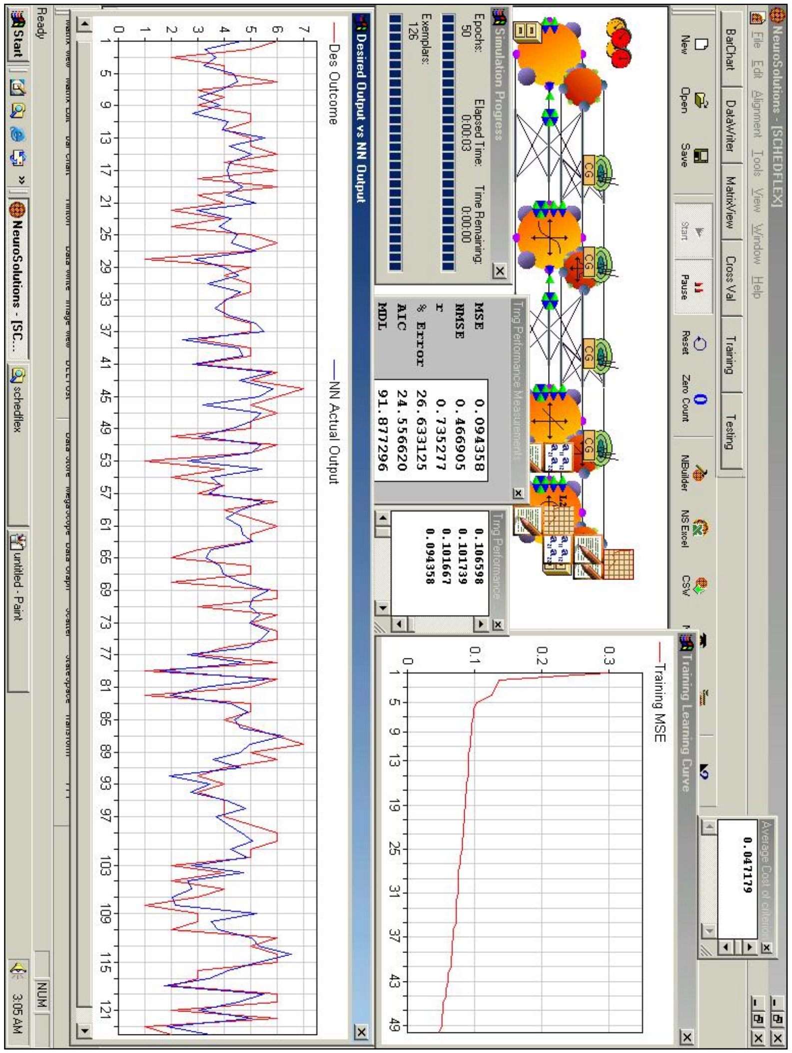

NeuroSolutions - [LEARNCURVE]
Simulation Progress
Desired Output vs NN Output
Des Outcome
NN Actual Output
MSE 0.086203
NMSE 0.582128
r 0.646479
% Error 23.361483
AIC 18.069292
MDL 84.101967
Training Learning Curve
Training MSE
0.043101

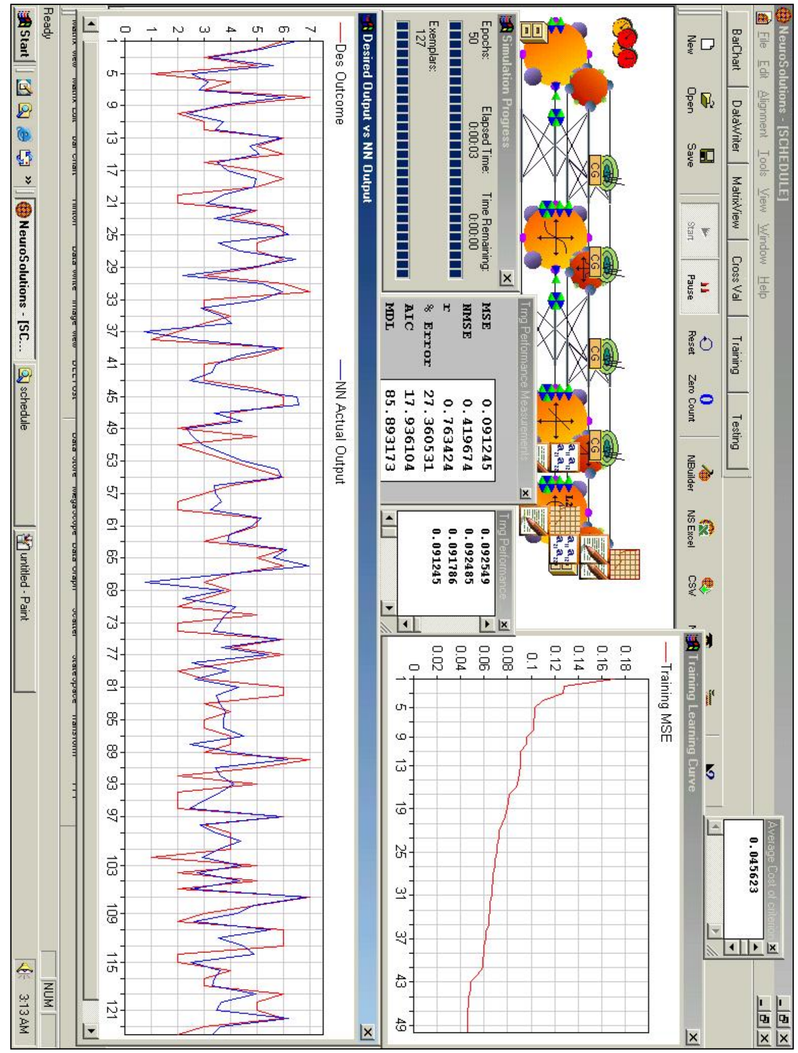

NeuroSolutions - [RESPORG]
Simulation Progress
Epochs: 50
Exemplars: 125
Trng Performance Measurements
MSE 0.100617
NMSE 0.523002
r 0.701955
% Error 29.718578
AIC 34.945938
MDL 101.625183
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
Average Cost of criterion
0.050309

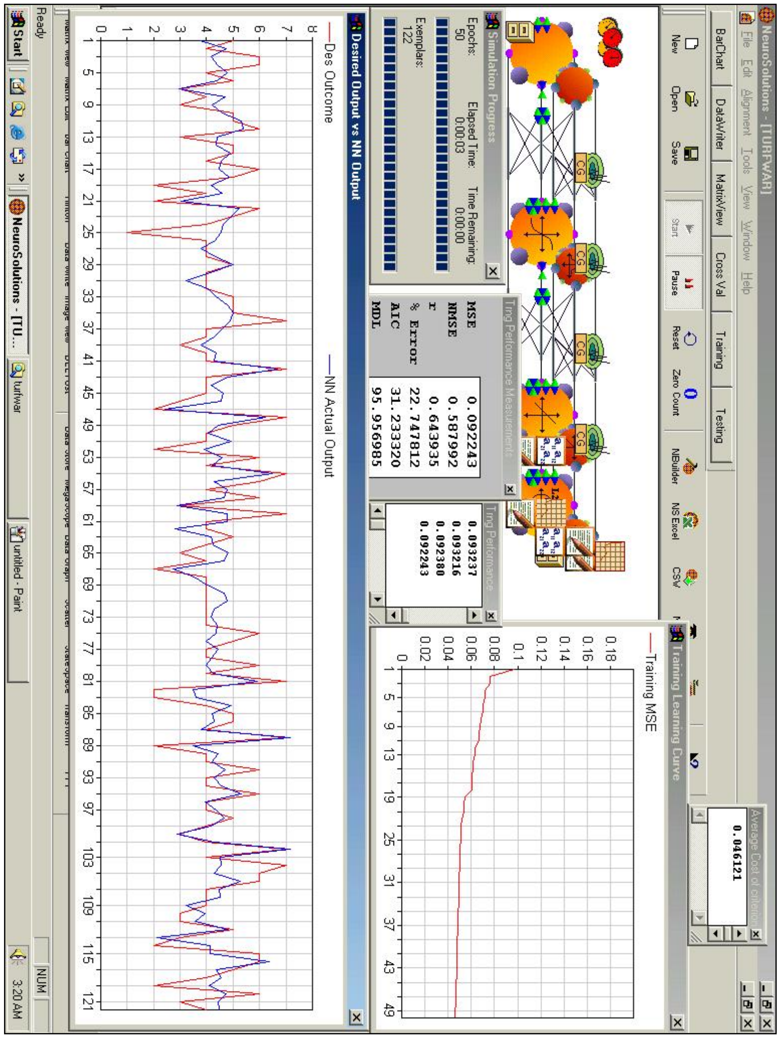

NeuroSolutions - [QUALITY]
Simulation Progress
Epochs: 50
Exemplars: 124
Trng Performance Measurements
MSE 0.091972
NMSE 0.513294
r 0.698619
% Error 22.977627
AIC 26.102779
MDL 92.135445
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
Average Cost of criterion
0.045986

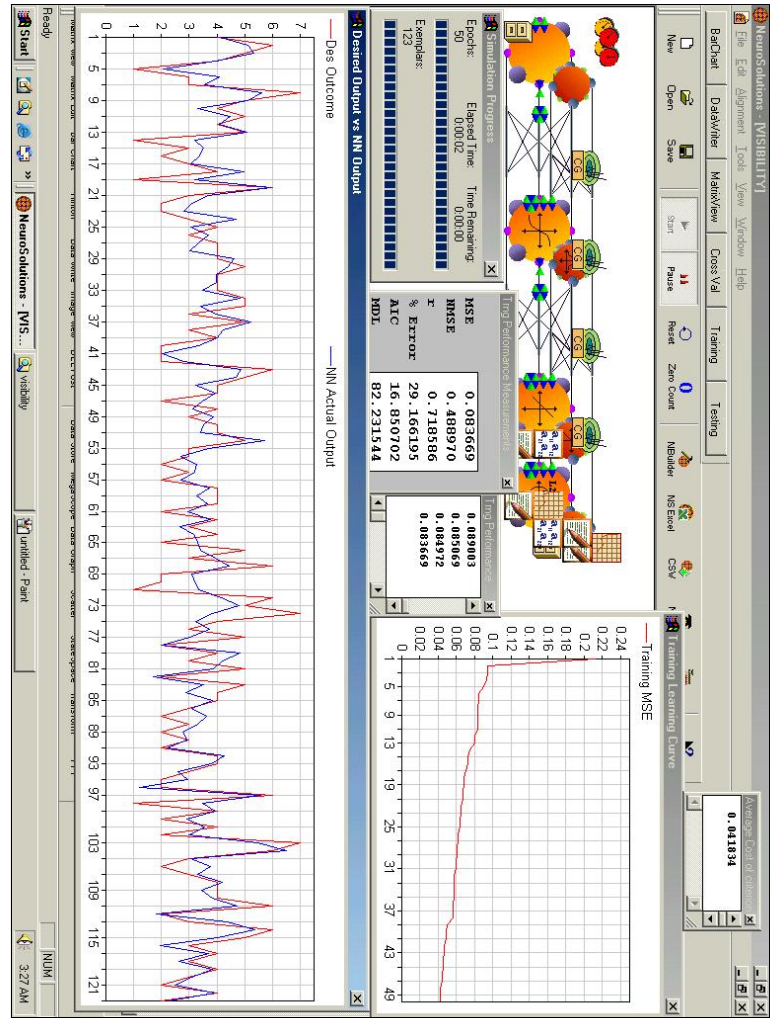

Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
MSE 0.078670
NMSE 0.483369
r 0.719307
% Error 21.127848
AIC 11.816568
MDL 76.540237
0.039335


NeuroSolutions - [RISK]
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
MSE 0.100819
NMSE 0.465316
r 0.733414
% Error 28.203377
AIC 35.196518
MDL 101.875763
0.050410


NeuroSolutions - [SCHEDFLEX]
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
Trng Performance Measurements
MSE 0.094358
NMSE 0.466905
r 0.735277
% Error 26.633125
AIC 24.556620
MDL 91.877296
Average Cost of criterion
0.047179


NeuroSolutions - [SCHEDULE]
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
Trng Performance Measurements
MSE 0.091245
NMSE 0.419674
r 0.763424
% Error 27.360531
AIC 17.936104
MDL 85.893173
Average Cost of criterion
0.045623


NeuroSolutions - [TURFWAR]
Simulation Progress
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
MSE 0.092243
RMSE 0.587992
r 0.643935
% Error 22.747812
AIC 31.233320
MDL 95.956985


NeuroSolutions - [VISIBILITY]
Simulation Progress
Desired Output vs NN Output
Des Outcome
NN Actual Output
Training Learning Curve
Training MSE
MSE 0.083669
RMSE 0.488970
r 0.718586
% Error 29.166195
AIC 16.850702
MDL 82.231544

Software Outsourcing — Study Objectives

We are researchers in the Arizona State University's Computer Science and Engineering Department who are investigating software development outsourcing. According to published accounts, software development outsourcing has become commonplace and often meets organizational goals. Unfortunately, nearly 30% of outsourcing relationships end poorly (anything from general dissatisfaction to legal action).

> **Definition**
>
> **Software development outsourcing**: hiring of vendors to perform software development activities or develop a portion of an overall software product. It does not include the hiring of temporary employees.

With your assistance, we hope to identify software outsourcing strategies, motivations, benefits, drawbacks, and relevant project situation variables. This information will help us to discern why outsourcing efforts succeed or fail to meet goals and which strategies are most appropriate for specific projects and goals. Using this knowledge, we will produce a process simulation tool which will allow researchers and project managers to more closely study the inter-organizational relations within a planned outsourcing relationship and their impact on the overall software development process. A second tool, for decision support, will then be constructed to aid software development project managers and consultants in making software outsourcing strategy decisions for specific projects.

Who can help?

You can help by completing this brief survey if, within the last 2 years, you have participated in a software development project where any portion of the product development or effort has been contracted to an outside vendor (regardless of which side of the relationship you worked on). This survey includes questions about your background, your most recent software outsourcing project, and general outsourcing experience over the past five years. The questionnaire is designed to take less than 15 minutes to complete.

What do I get for helping?

If you choose to participate, your answers will be held in the **strictest** confidence. Only our research team will see your individual answers. Our reports will consist of summaries of data from all respondents. When completed (planned for late spring 1999), these summary reports will be available to survey participants via our outsourcing website (http://www.eas.asu.edu/~outsrc/). **If you provide the optional contact information, you will be notified when survey results are posted and will be provided with free copies of the decision support tools when they become available.**

Feel free to contact us with any questions you might have regarding our research. Thank you for your assistance.

Brian G. Hermann
Ph.D. Candidate
Department of Computer Science and Engineering
Arizona State University
brian.hermann@asu.edu

Stephen T. Roehling
Master's Candidate
Department of Computer Science and Engineering
Arizona State University
roehling@imap3.asu.edu

I. Instructions

1. For the purposes of this study, we define software development outsourcing as the hiring of vendors to perform software development activities or to develop a portion of a software product. It does not include the hiring of temporary employees.
2. Please answer every question. Some questions may look like others, but each one is different.
3. There are no right or wrong answers. Please provide a realistic assessment of each item based on your experiences. The focus of the survey is on your experience, not on what you wish were true or what may be true in the future.
4. For questions pertaining to this survey please contact Brian Hermann via e-mail at brian.hermann@asu.edu.
5. Please return this survey to:

   Brian G. Hermann
   Computer Science and Engineering Department
   College of Engineering and Applied Sciences
   Arizona State University
   Box 875406
   Tempe, AZ 85287-5406, U.S.A.

6. Please remove this page for your information and continue with the survey.

Confidentiality

Your responses to this survey are confidential. As summarized below, no organization or individual respondent will be identified by name in any analyses or report without your written permission.

PUBLIC LAW 93-759, entitled the Privacy Act of 1974 requires that all individuals be informed of the purposes and uses to be made of the information which is solicited. The following is furnished to explain why the information is requested and the general uses to which the information may be put.

Purpose: This study strives to examine software outsourcing strategies, motivations, benefits, drawbacks, and relevant project situation variables. The survey results will be used both to better understand software outsourcing, as well as to develop a software outsourcing process simulation tool.

Uses: Survey data are used for research purposes only. Individual responses are confidential. Only summarized data will be reported to you, if you so request, and academic audiences.

Effects of Non-Disclosure: Participation in the study is voluntary. No penalty will be imposed for failure to respond to any particular question.

II. Background Information

1. **How many software development projects involving outsourcing have you participated in during the past five years? __________ Projects**

2. **Roughly, what portion of your organization's software development has been outsourced during the past five years? __________ %**

3. **The final result of this research will be a suite of software tools to help practitioners in various roles evaluate software outsourcing strategies and better understand software outsourcing dynamics and constraints. Would these types of tools be helpful to you?**

   ❑ Yes ❑ No

   Why or Why Not? ____

   ____

4. **In the future, would you like to be contacted to have the opportunity to provide inputs to other software outsourcing research questionnaires and to receive copies of the software outsourcing decision support and simulation tools?**

   ❑ Yes ❑ No

5. **Please provide your name and best method of contact (all results will be kept confidential)**

Name	
Electronic mail	
Telephone	( ) – extension
Standard Mail	

III. Most Recent Software Development Outsourcing Project Experience

Please answer the following questions for the *most recent* software outsourcing project that you worked on (within the last 2 years). If you have worked on multiple projects recently, please answer the questions utilizing the project about which you have the most knowledge.

6. **What type of software was developed in this project? Please check application area (domain) and/or project type.**

- **Systems software, e.g.:**
  - ❑ Avionics
  - ❑ Embedded controllers and firm-ware
  - ❑ Communications systems
  - ❑ Device drivers
  - ❑ Other: ____________________________

    ____

- **Shrink-wrap commercial/consumer software products, e.g.:**
  - ❑ Entertainment
  - ❑ Business productivity
  - ❑ Utilities
  - ❑ Internet
  - ❑ Other: ____________________________

    ____

- **Software component development, e.g.:**
  - ❑ Domain frameworks
  - ❑ CASE tools
  - ❑ Class libraries
  - ❑ Operating systems
  - ❑ Development tools
  - ❑ Other: ____________________________

    ____

- **Enterprise software development and package customization, e.g.:**
  - ❑ Accounting systems
  - ❑ Manufacturing requirements planning
  - ❑ Payroll systems
  - ❑ Order Entry System
  - ❑ Scripting and extensions development
  - ❑ Interactive web-site development
  - ❑ Other: ____________________________

    ____

7. **Which software development *process* components or activities were outsourced on this project? (Select all that apply)**

   - ❑ Requirements
   - ❑ Design
   - ❑ Testing
   - ❑ Maintenance
   - ❑ Reengineering
   - ❑ Application support (for enterprise systems)
   - ❑ Training (e.g., languages, processes)
   - ❑ Specification
   - ❑ Documentation
   - ❑ Coding
   - ❑ Fielding
   - ❑ Configuration management
   - ❑ Tools support (e.g., requirements database, version control tool)
   - ❑ Software engineering support (e.g., code reviews, SEI reviews, quality reviews)
   - ❑ None
   - ❑ Other (please list) ____________________

     ____

How would you describe the process components you outsourced? ________________________________

____

____

8. **Which *product* components were outsourced during this software development?**

   - ❑ Custom (specialized)
   - ❑ Common application (off the shelf)
   - ❑ Common application (customized version of an available component)
   - ❑ None
   - ❑ Other (please list) ____

____

How would you describe the product components you outsourced? ________________________________

____

____

9. **With respect to in-house development, what project goals (motivations for outsourcing) were part of the decision to outsource software development for this project?**

Please note there are two parts to this question:

a. Estimate the importance of each goal using the importance scale and the blanks to the left of each goal.

b. Estimate the degree to which these goals were realized by the selected outsourcing strategy -- circle the appropriate number on the scale to the right of each goal.

Importance Scale

Not Important		Somewhat Important		Very Important
1	2	3	4	5

Importance	Goals	Significantly Worse than Expectations		Exactly on Target		Significantly Better than Expectations
	Costs & Schedule					
_______	a. Reduce project costs by taking advantage of outsourcing vendor's economies of scale	1	2	3	4	5
_______	b. Reduce development schedule — a vendor can complete the job faster than our in-house team	1	2	3	4	5
_______	c. Reduce development schedule — parallel activities from dividing the effort speeds up the overall schedule	1	2	3	4	5
_______	d. Cash flow from sale of the outsourced product's distribution rights to the outsourcing vendor	1	2	3	4	5
	Personnel					
_______	e. Acquire expertise not available within the internal organization (e.g. domain, language, tool, etc.)	1	2	3	4	5
_______	f. Add more personnel to the project (necessary due to an insufficient in-house capacity)	1	2	3	4	5
_______	g. Add more personnel to fill a short-term, part-time or transient need for effort (e.g., only for fielding at the end of the project)	1	2	3	4	5
_______	h. Outsource 'non-core' activities	1	2	3	4	5
_______	i. Control over outsourced project management process	1	2	3	4	5
_______	j. Improved response to customer objectives	1	2	3	4	5
_______	k. Improved response to organizational objectives and strategies	1	2	3	4	5
_______	l. Keep in-house staffing levels more stable	1	2	3	4	5
	General					
_______	m. Risk sharing or reduction of likelihood and/or consequence (e.g., technical, cost)	1	2	3	4	5
_______	n. Product quality improvement	1	2	3	4	5
	Other (please list)					
_______	o. ______________________	1	2	3	4	5
_______	p. ______________________	1	2	3	4	5
_______	q. ______________________	1	2	3	4	5

10. **What were the consequences of outsourcing in this project in comparison to similar in-house efforts? (Put the appropriate number from the consequence scale in the blank next to each factor)**

Decreased Dramatically	Decreased Significantly	Decreased Slightly	No Change	Increased Slightly	Increased Significantly	Increased Dramatically
1	2	3	4	5	6	7

____ a. Project costs

____ b. Development schedule (vendor outsourcing compared to in-house)

____ c. Intellectual capital (your organization's rights to the developed software product)

____ d. Scheduling flexibility (including ability to respond to immediate needs such as a late project productivity burst)

____ e. Administrative overhead

____ f. Control over outsourced project management process

____ g. In-house effort spent on 'non-core' activities

____ h. In-house personnel turnover

____ i. Project learning curve (time required to become productive on the project)

____ j. Development risks

____ k. Product quality

____ l. Rework

____ m. Visibility into software development process (ability to ascertain development progress, adherence to process standards, and product quality)

____ n. Control over final product

____ o. Costs associated with design or requirements changes

____ p. Cultural, location, and language problems

____ q. Turf wars (e.g. finger pointing between development groups -- either in-house or vendors)

____ r. Likelihood of a failed or cancelled project

____ s. Response to customer objectives

____ t. Response to organizational objectives and strategies

Other (please list any other outsourcing consequences not already shown -- include impact rating if appropriate)

____ u. ______________________

____ v. ______________________

____ w. ______________________

11. On this project who (or what project roles) drove outsourcing decision making? (Select all that apply)

Outsourcing Customer (organization which hires and outside vendor to develop software)	**Outsourcing Vendor** (organization which develops software for another organization)
❑ Project manager	❑ Project manager
❑ Contract officer	❑ Contract officer
❑ Technical lead	❑ Technical lead
❑ Software developer	❑ Software developer
❑ Corporate management policy	❑ Other (Please Explain) ________________ ________________________________
❑ Corporate management (one-time decision)	
❑ Management consultant working for an outsourcing customer	
❑ Other (Please Explain) ________________ ________________________________	

12. What role(s) did you play in this software outsourcing relationship?(Select all that apply)

Outsourcing Customer (organization which hires and outside vendor to develop software)	**Outsourcing Vendor** (organization which develops software for another organization)
❑ Project manager	❑ Project manager
❑ Contract officer	❑ Contract officer
❑ Technical lead	❑ Technical lead
❑ Software developer	❑ Software developer
❑ Management consultant working for an outsourcing customer	❑ Other (Please Explain) ________________ ________________________________
❑ Other (Please Explain) ________________ ________________________________	

IV. General Outsourcing Experience

Instructions - Consider outsourcing projects you've worked on in the last five years.

13. Based upon your experience, identify your level of agreement with the following assertions about software development outsourcing.
(Put the appropriate number from the scale in the blank next to each assertion)

Agreement Scale

Strongly Disagree		Neither Agree Nor Disagree		Strongly Agree
1	2	3	4	5

Project Assertions

_____ a. Outsourcing portions of larger software development projects is more successful than outsourcing portions of smaller software development projects.

_____ b. Larger outsourcing efforts are more successful than smaller outsourcing efforts.

_____ c. Outsourcing development of software in some domains is more successful than outsourcing development of software in other domains.

_____ d. Outsourcing development of software in a domain familiar to the **buyer** (in-house organization) is more successful than outsourcing development of software in an unfamiliar domain.

_____ e. Outsourcing development of software in a domain familiar to the **vendor** is more successful than outsourcing development of software in a domain with which the vendor is unfamiliar.

_____ f. Outsourcing development of software is more successful when more vendors are available in the project domain.

_____ g. Outsourcing development of software is more successful when the software vendor has more experience with tools or languages.

_____ h. Outsourcing development of software is more successful when the software vendor has reusable design or code components.

Buyer-Seller Relationship and Contract Assertions

_____ i. Outsourcing projects with frequent reviews and inspections are more successful than outsourcing projects with less frequent reviews and inspections.

_____ j. Outsourcing project success is closely related to payment strategies and incentives in the vendor contract (e.g., fixed-price contracts projects are more or less successful than cost-plus type contracts).

_____ k. Outsourcing project success is closely tied to the form of communication between the buyer and vendor (forms of communication include formal letters, e-mail, telephone conversations, face-to-face meetings, etc.).

_____ l. Outsourcing projects are more successful when the buyer has more visibility into the vendor's development process.

_____ m. Outsourcing projects are more successful when the buyer and vendor are located nearby.

_____ n. Outsourcing projects are more successful when the buyer and vendor are located far apart (such as "off-shore" arrangements) because time differences increase the collaborative work day length.

_____ o. Outsourcing projects are more successful when the buyer and vendor have previously worked together successfully.

_____ p. Outsourcing development of software is more successful when the software **vendor** has a higher process maturity (e.g. SEI CMM rating).

_____ q. Outsourcing development of software is more successful when the **buyer** has a higher process maturity (e.g. SEI CMM rating).

_____ r. Outsourcing development of software is more successful when the vendor has a successful track record.

(Question 13 Continued) Based upon your experience, identify your level of agreement with the following assertions about software development outsourcing.
(Put the appropriate number from the scale in the blank next to each assertion)

Agreement Scale				
Strongly Disagree		Neither Agree Nor Disagree		Strongly Agree
1	2	3	4	5

Goal and Expectation Assertions

_____ s. Outsourcing projects with more aggressive cost reduction goals are **less likely** to be successful than those with more modest cost reduction goals.

_____ t. Outsourcing projects with more aggressive cost reduction goals are **more likely** to be successful than those with more modest cost reduction goals.

_____ u. Outsourcing projects with more aggressive schedule duration reduction goals are **less likely** to be successful than those with more modest schedule duration reduction goals.

_____ v. Outsourcing projects with more aggressive schedule duration reduction goals are **more likely** to be successful than those with more modest schedule duration reduction goals.

Product Assertions

_____ w. Outsourcing development of software is more successful when the system is not complex.

_____ x. Outsourcing development of software is more successful when the system can be easily divided into components (highly modular).

Other Assertions (please list)

_____ y. ______________________

_____ z. ______________________

_____ aa. ______________________

14. Based on your experience, identify your level of agreement with each of the following assertions about which factors determine whether *product* component outsourcing will be successful.
(Put the appropriate number from the scale in the blank next to each assertion)

Agreement Scale				
Strongly Disagree		Neither Agree Nor Disagree		Strongly Agree
1	2	3	4	5

_____ a. Outsourcing larger components is generally more successful than outsourcing smaller components.

_____ b. Outsourcing smaller components is generally more successful than outsourcing larger components.

_____ c. Outsourcing components of highly modular products is generally more successful than outsourcing components of monolithic products.

_____ d. Outsourcing is more successful when the interfaces for an outsourced component are well-defined.

_____ e. Outsourcing is more successful when the tools and languages used by both in-house and vendor developers are compatible.

_____ f. Outsourcing is more successful when an outsourced component's requirements are well-defined up-front.

_____ g. Outsourcing is more successful when the vendor and buyer organizations communicate well and overcome administrative obstacles to solve problems.

Other (please list)

_____ h. ______________________

_____ i. ______________________

_____ j. ______________________

15. **Based on your experience, identify your level of agreement with each of the following assertions about which factors determine if *process* component (development activity) outsourcing will be successful. (Put the appropriate number from the scale in the blank next to each assertion)**

Agreement Scale				
Strongly Disagree		Neither Agree Nor Disagree		Strongly Agree
1	2	3	4	5

_____ a. Outsourcing is more successful when organizational interfaces and responsibilities are well-defined than when organizational interfaces and responsibilities are loosely defined.

_____ b. Outsourcing is more successful when organizational lifecycle models (e.g. prototyping, spiral, waterfall, incremental) used by both the vendor and buyer are the same rather than different.

_____ c. Outsourcing is more successful when tools and methods allow information to flow easily between the vendor and in-house organization.

_____ d. Outsourcing is more successful when the vendor's process maturity (e.g. SEI CMM rating) is higher.

_____ e. Outsourcing is more successful when the in-house organization's process maturity (e.g. SEI CMM rating) is higher.

_____ f. Outsourcing is more successful when the buyer's and vendor's process maturity levels (e.g. SEI CMM rating) are the same or close than when the ratings differ greatly.

Other (please list)

_____ g. ____

_____ h. ____

_____ i. ____

16. **Do you have any general comments about the survey, or software outsourcing in general?**

____

____

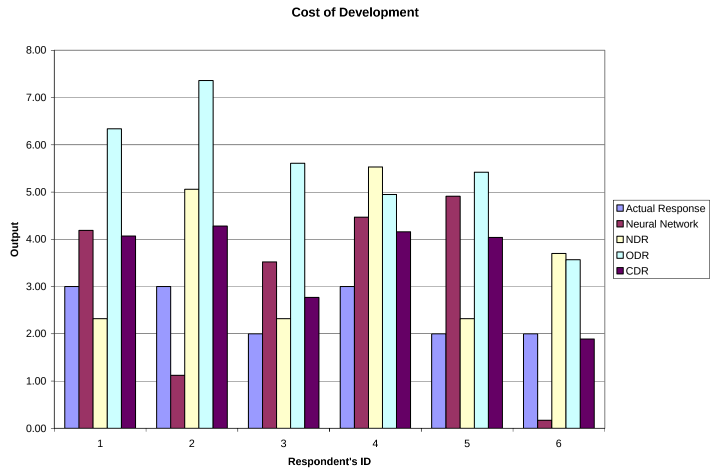
____

____

____

____

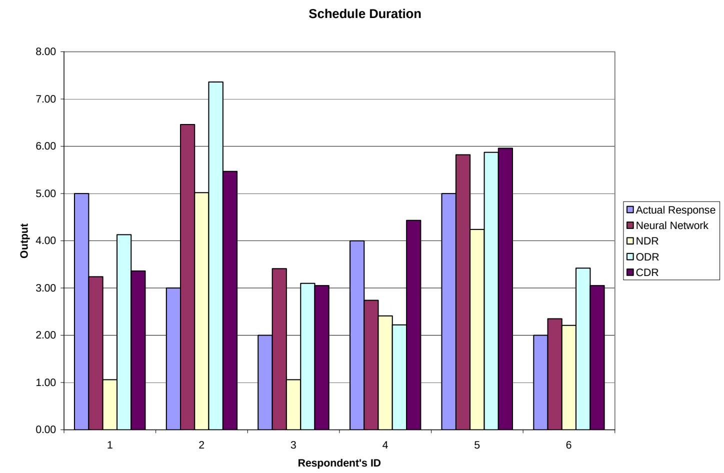
Appendix H



Cost Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	3.00	4.19	2.32	6.34	4.07	1.19	0.68	3.34	1.07
2	3.00	1.12	5.06	7.36	4.28	1.88	2.06	4.36	1.28
3	2.00	3.52	2.32	5.61	2.77	1.52	0.32	3.61	0.77
4	3.00	4.47	5.53	4.95	4.16	1.47	2.53	1.95	1.16
5	2.00	4.91	2.32	5.42	4.04	2.91	0.32	3.42	2.04
6	2.00	0.17	3.70	3.57	1.89	1.83	1.70	1.57	0.11
Total Difference (Neural Network):						10.80			
Total Difference (New Data Regression):							7.61		
Total Difference (Old Data Regression):								18.25	
Total Difference (Combined Data Regression):									6.43

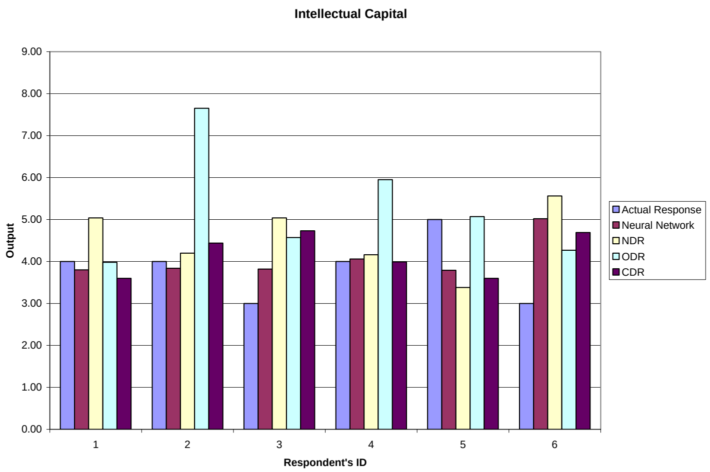
Model Closest to Actual Result:
NN – 3rd
NDR – 2nd
ODR – 4th
CDR – 1st



Schedule Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	3.24	1.06	4.13	3.36	1.76	3.94	0.87	1.64
2	3.00	6.46	5.02	7.36	5.47	3.46	2.02	4.36	2.47
3	2.00	3.41	1.06	3.10	3.05	1.41	0.94	1.10	1.05
4	4.00	2.74	2.41	2.22	4.43	1.26	1.59	1.78	0.43
5	5.00	5.82	4.24	5.87	5.96	0.82	0.76	0.87	0.96
6	2.00	2.35	2.21	3.42	3.05	0.35	0.21	1.42	1.05
Total Difference (Neural Network):						9.06			
Total Difference (New Data Regression):							9.46		
Total Difference (Old Data Regression):								10.40	
Total Difference (Combined Data Regression):									7.60

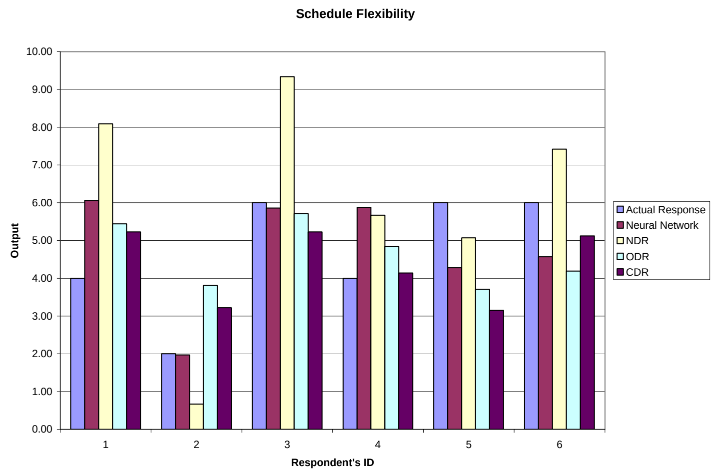
Model Closest to Actual Result:
NN – 2nd
NDR – 3rd
ODR – 4th
CDR – 1st



Intellectual Capital Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	4.00	3.80	5.04	3.98	3.60	0.20	1.04	0.02	0.40
2	4.00	3.84	4.20	7.65	4.44	0.16	0.20	3.65	0.44
3	3.00	3.82	5.04	4.57	4.73	0.82	2.04	1.57	1.73
4	4.00	4.06	4.16	5.95	3.99	0.06	0.16	1.95	0.01
5	5.00	3.79	3.38	5.07	3.60	1.21	1.62	0.07	1.40
6	3.00	5.02	5.56	4.27	4.69	2.02	2.56	1.27	1.69
Total Difference (Neural Network):						4.47			
Total Difference (New Data Regression):							7.62		
Total Difference (Old Data Regression):								8.53	
Total Difference (Combined Data Regression):									5.67

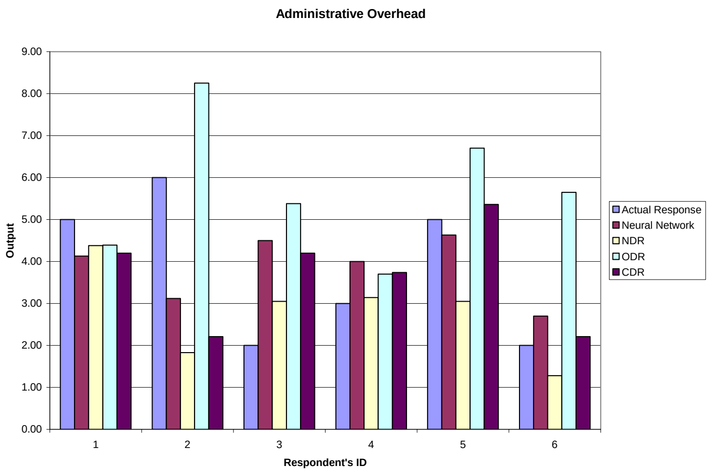
Model Closest to Actual Result:
NN – 1st
NDR – 3rd
ODR – 4th
CDR – 2nd



Schedule Flexibility Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	4.00	6.06	8.09	5.44	5.23	2.06	4.09	1.44	1.23
2	2.00	1.97	0.67	3.81	3.22	0.03	1.33	1.81	1.22
3	6.00	5.86	9.34	5.71	5.23	0.14	3.34	0.29	0.77
4	4.00	5.88	5.67	4.84	4.14	1.88	1.67	0.84	0.14
5	6.00	4.28	5.07	3.71	3.15	1.72	0.93	2.29	2.85
6	6.00	4.57	7.42	4.19	5.12	1.43	1.42	1.81	0.88
Total Difference (Neural Network):						7.26			
Total Difference (New Data Regression):							12.78		
Total Difference (Old Data Regression):								8.48	
Total Difference (Combined Data Regression):									7.09

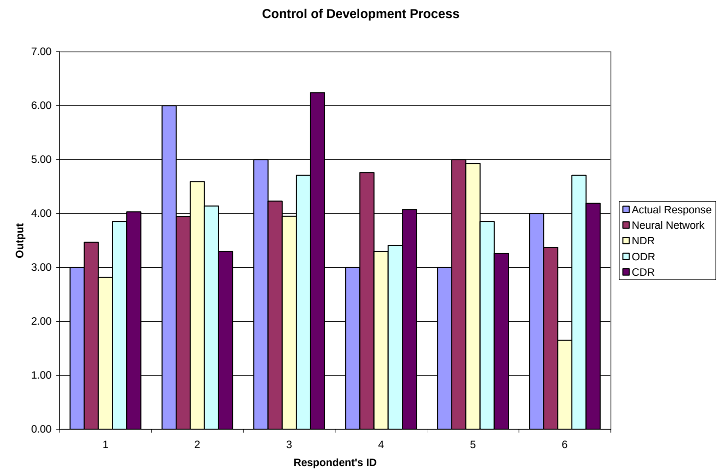
Model Closest to Actual Result:
NN – 2nd
NDR – 4th
ODR – 3rd
CDR – 1st



Administrative Overhead Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	4.13	4.38	4.39	4.20	0.87	0.62	0.61	0.80
2	6.00	3.12	1.83	8.25	2.21	2.88	4.17	2.25	3.79
3	2.00	4.50	3.05	5.38	4.20	2.50	1.05	3.38	2.20
4	3.00	4.00	3.14	3.70	3.74	1.00	0.14	0.70	0.74
5	5.00	4.63	3.05	6.70	5.36	0.37	1.95	1.70	0.36
6	2.00	2.70	1.28	5.65	2.21	0.70	0.72	3.65	0.21
Total Difference (Neural Network):						8.32			
Total Difference (New Data Regression):							8.65		
Total Difference (Old Data Regression):								12.29	
Total Difference (Combined Data Regression):									8.10

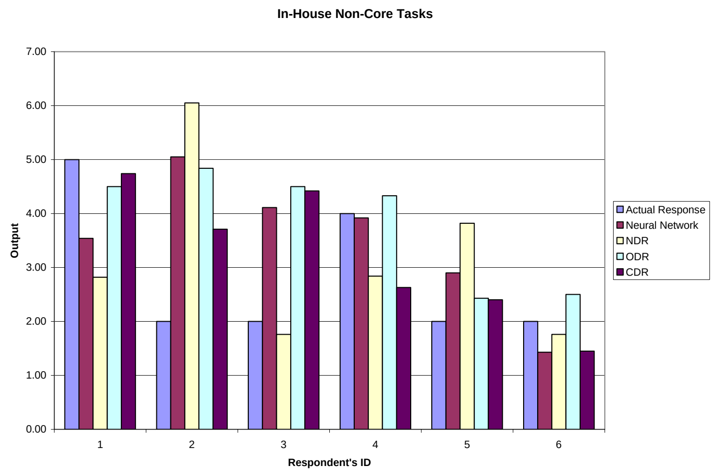
Model Closest to Actual Result:
NN – 2nd
NDR – 3rd
ODR – 4th
CDR – 1st

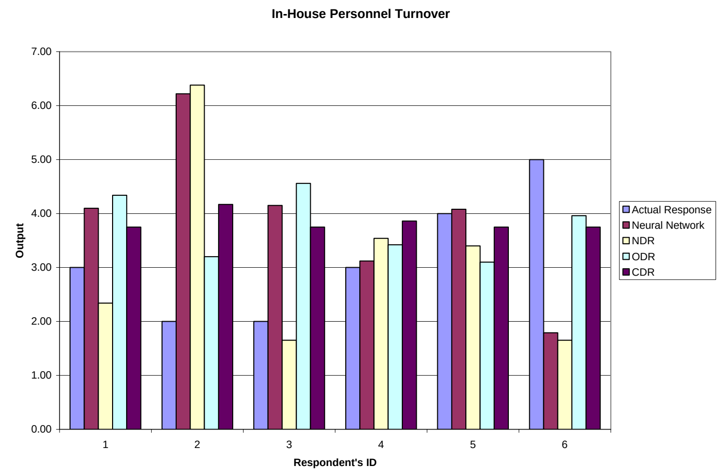


Control Process Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	3.00	3.47	2.82	3.85	4.03	0.47	0.18	0.85	1.03
2	6.00	3.94	4.59	4.14	3.30	2.06	1.41	1.86	2.70
3	5.00	4.23	3.95	4.71	6.24	0.77	1.05	0.29	1.24
4	3.00	4.76	3.30	3.41	4.07	1.76	0.30	0.41	1.07
5	3.00	5.00	4.93	3.85	3.26	2.00	1.93	0.85	0.26
6	4.00	3.37	1.65	4.71	4.19	0.63	2.35	0.71	0.19
Total Difference (Neural Network):						7.69			
Total Difference (New Data Regression):							7.22		
Total Difference (Old Data Regression):								4.97	
Total Difference (Combined Data Regression):									6.49

Model Closest to Actual Result:
NN – 4th
NDR – 3rd
ODR – 1st
CDR – 2nd





In-house Non-Core Consequence Validation Table:

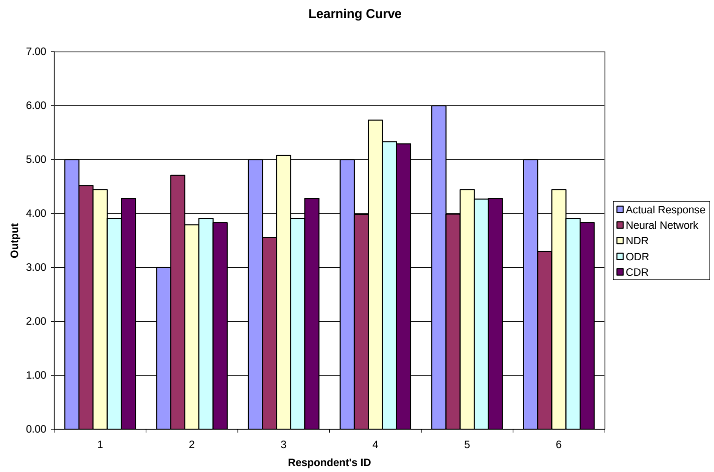
Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	3.54	2.82	4.50	4.74	1.46	2.18	0.50	0.26
2	2.00	5.05	6.05	4.84	3.71	3.05	4.05	2.84	1.71
3	2.00	4.11	1.76	4.50	4.42	2.11	0.24	2.50	2.42
4	4.00	3.92	2.84	4.33	2.63	0.08	1.16	0.33	1.37
5	2.00	2.90	3.82	2.43	2.40	0.90	1.82	0.43	0.40
6	2.00	1.43	1.76	2.50	1.45	0.57	0.24	0.50	0.55
Total Difference (Neural Network):						8.17			
Total Difference (New Data Regression):							9.69		
Total Difference (Old Data Regression):								7.10	
Total Difference (Combined Data Regression):									6.71

Model Closest to Actual Result:
NN – 3rd
NDR – 4th
ODR – 2nd
CDR – 1st

In-house Personnel Turnover Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	3.00	4.10	2.34	4.34	3.75	1.10	0.66	1.34	0.75
2	2.00	6.22	6.38	3.20	4.17	4.22	4.38	1.20	2.17
3	2.00	4.15	1.65	4.56	3.75	2.15	0.35	2.56	1.75
4	3.00	3.12	3.54	3.42	3.86	0.12	0.54	0.42	0.86
5	4.00	4.08	3.40	3.10	3.75	0.08	0.60	0.90	0.25
6	5.00	1.79	1.65	3.96	3.75	3.21	3.35	1.04	1.25
Total Difference (Neural Network):						10.88			
Total Difference (New Data Regression):							9.88		
Total Difference (Old Data Regression):								7.46	
Total Difference (Combined Data Regression):									7.03

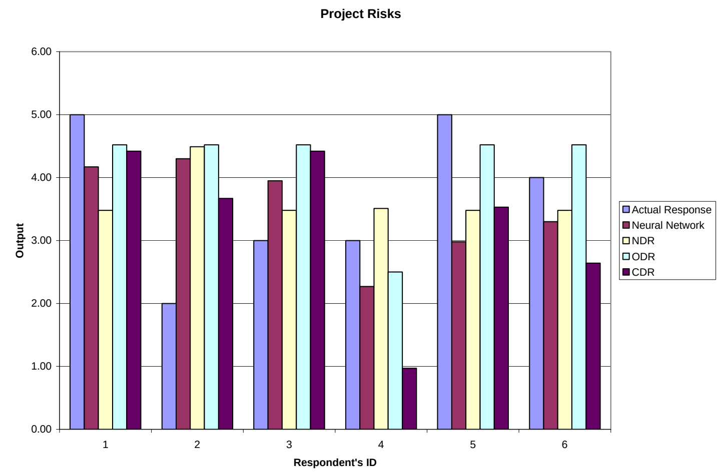
Model Closest to Actual Result:
NN – 4th
NDR – 3rd
ODR – 2nd
CDR – 1st



Learning Curve Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	4.52	4.44	3.91	4.28	0.48	0.56	1.09	0.72
2	3.00	4.71	3.79	3.91	3.83	1.71	0.79	0.91	0.83
3	5.00	3.56	5.08	3.91	4.28	1.44	0.08	1.09	0.72
4	5.00	3.98	5.73	5.33	5.29	1.02	0.73	0.33	0.29
5	6.00	3.99	4.44	4.27	4.28	2.01	1.56	1.73	1.72
6	5.00	3.30	4.44	3.91	3.83	1.70	0.56	1.09	1.17
Total Difference (Neural Network):						8.36			
Total Difference (New Data Regression):							4.28		
Total Difference (Old Data Regression):								6.24	
Total Difference (Combined Data Regression):									5.45

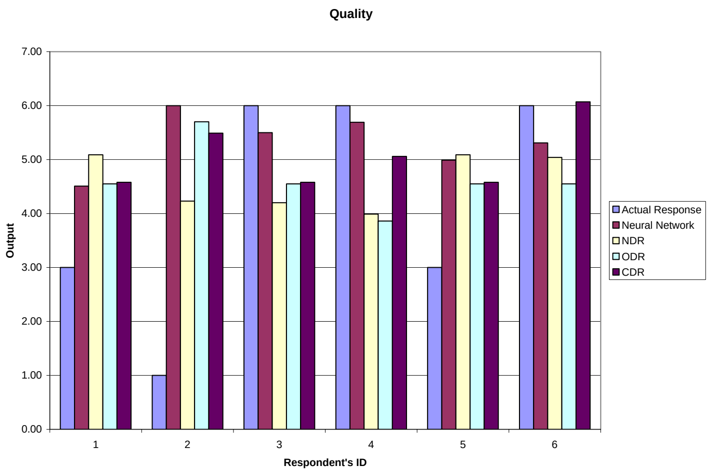
Model Closest to Actual Result:
NN – 4th
NDR – 1st
ODR – 3rd
CDR – 2nd



Risk Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	4.17	3.48	4.52	4.42	0.83	1.52	0.48	0.58
2	2.00	4.30	4.49	4.52	3.67	2.30	2.49	2.52	1.67
3	3.00	3.95	3.48	4.52	4.42	0.95	0.48	1.52	1.42
4	3.00	2.27	3.51	2.50	0.97	0.73	0.51	0.50	2.03
5	5.00	2.98	3.48	4.52	3.53	2.02	1.52	0.48	1.47
6	4.00	3.30	3.48	4.52	2.64	0.70	0.52	0.52	1.36
Total Difference (Neural Network):						7.53			
Total Difference (New Data Regression):							7.04		
Total Difference (Old Data Regression):								6.02	
Total Difference (Combined Data Regression):									8.53

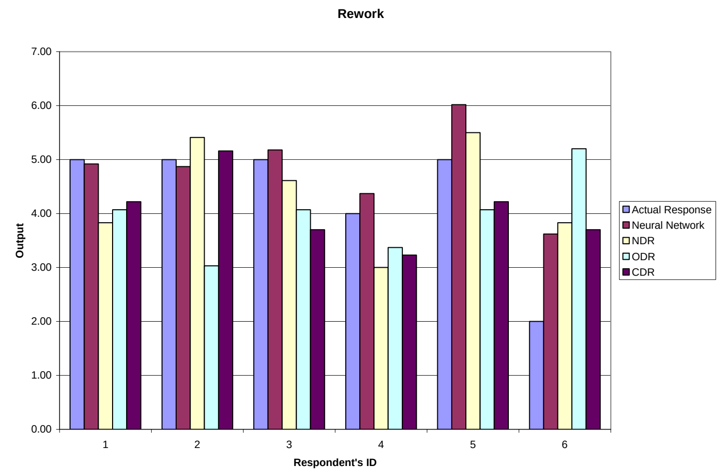
Model Closest to Actual Result:
NN – 3rd
NDR – 2nd
ODR – 1st
CDR – 4th



Quality Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	3.00	4.51	5.09	4.55	4.58	1.51	2.09	1.55	1.58
2	1.00	6.00	4.23	5.70	5.49	5.00	3.23	4.70	4.49
3	6.00	5.50	4.20	4.55	4.58	0.50	1.80	1.45	1.42
4	6.00	5.69	3.99	3.86	5.06	0.31	2.01	2.14	0.94
5	3.00	4.99	5.09	4.55	4.58	1.99	2.09	1.55	1.58
6	6.00	5.31	5.04	4.55	6.07	0.69	0.96	1.45	0.07
Total Difference (Neural Network):						10.00			
Total Difference (New Data Regression):							12.18		
Total Difference (Old Data Regression):								12.84	
Total Difference (Combined Data Regression):									10.08

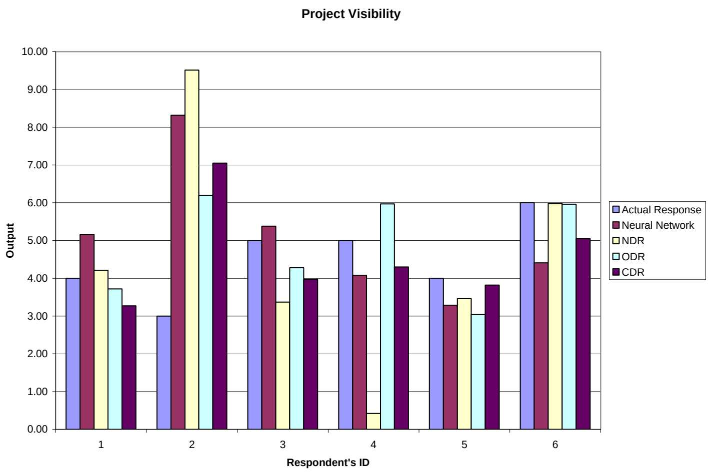
Model Closest to Actual Result:
NN – 1st
NDR – 3rd
ODR – 4th
CDR – 2nd



Rework Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	4.92	3.83	4.07	4.22	0.08	1.17	0.93	0.78
2	5.00	4.87	5.41	3.03	5.16	0.13	0.41	1.97	0.16
3	5.00	5.18	4.61	4.07	3.70	0.18	0.39	0.93	1.30
4	4.00	4.37	3.00	3.37	3.23	0.37	1.00	0.63	0.77
5	5.00	6.02	5.50	4.07	4.22	1.02	0.50	0.93	0.78
6	2.00	3.62	3.83	5.20	3.70	1.62	1.83	3.20	1.70
Total Difference (Neural Network):						3.40			
Total Difference (New Data Regression):							5.30		
Total Difference (Old Data Regression):								8.59	
Total Difference (Combined Data Regression):									5.49

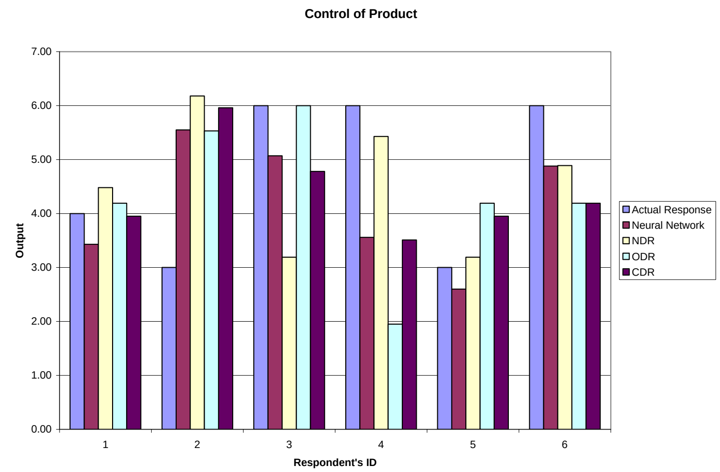
Model Closest to Actual Result:
NN – 1st
NDR – 2nd
ODR – 4th
CDR – 3rd



Visibility Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	4.00	5.16	4.21	3.72	3.27	1.16	0.21	0.28	0.73
2	3.00	8.32	9.51	6.20	7.05	5.32	6.51	3.20	4.05
3	5.00	5.38	3.37	4.28	3.97	0.38	1.63	0.72	1.03
4	5.00	4.08	0.42	5.97	4.30	0.92	4.58	0.97	0.70
5	4.00	3.29	3.46	3.04	3.82	0.71	0.54	0.96	0.18
6	6.00	4.41	5.98	5.96	5.05	1.59	0.02	0.04	0.95
Total Difference (Neural Network):						10.08			
Total Difference (New Data Regression):							13.49		
Total Difference (Old Data Regression):								6.17	
Total Difference (Combined Data Regression):									7.64

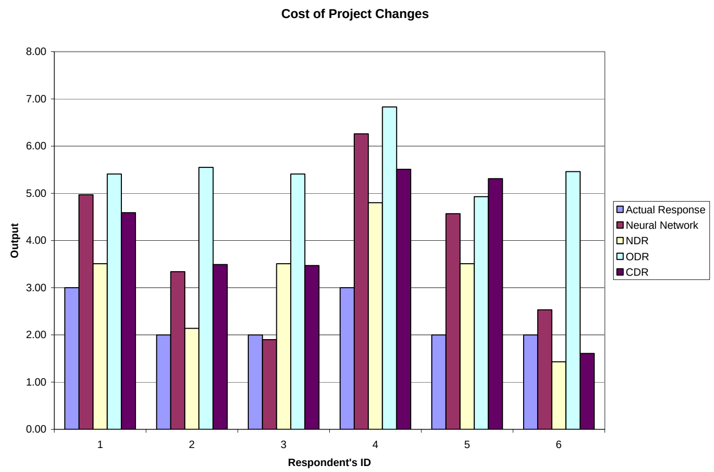
Model Closest to Actual Result:
NN – 3rd
NDR – 4th
ODR – 1st
CDR – 2nd

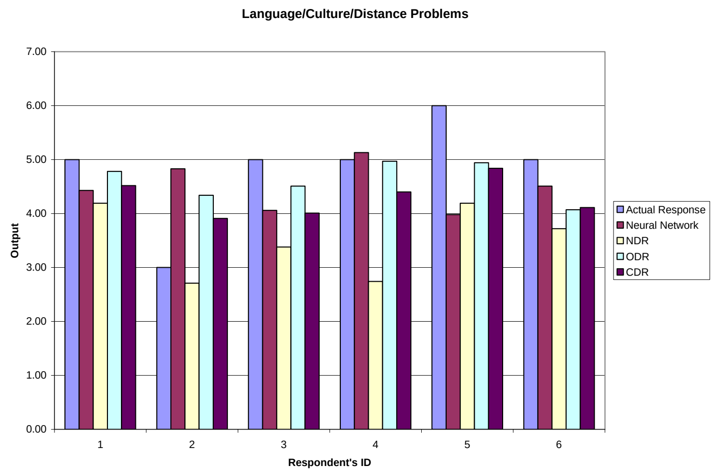


Control Product Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	4.00	3.43	4.48	4.19	3.95	0.57	0.48	0.19	0.05
2	3.00	5.55	6.18	5.53	5.96	2.55	3.18	2.53	2.96
3	6.00	5.07	3.19	6.00	4.78	0.93	2.81	0.00	1.22
4	6.00	3.56	5.43	1.95	3.51	2.44	0.57	4.05	2.49
5	3.00	2.60	3.19	4.19	3.95	0.40	0.19	1.19	0.95
6	6.00	4.88	4.89	4.19	4.19	1.12	1.11	1.81	1.81
Total Difference (Neural Network):						8.01			
Total Difference (New Data Regression):							8.34		
Total Difference (Old Data Regression):								9.77	
Total Difference (Combined Data Regression):									9.48

Model Closest to Actual Result:
NN – 1st
NDR – 2nd
ODR – 4th
CDR – 2nd





Change Cost Consequence Validation Table:

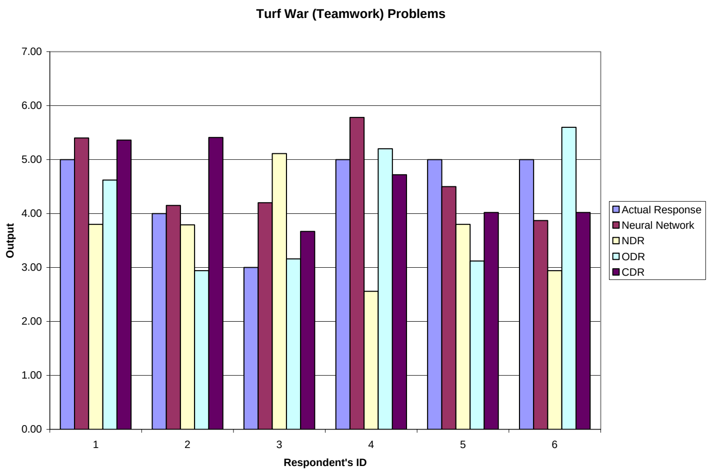
Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	3.00	4.97	3.51	5.41	4.59	1.97	0.51	2.41	1.59
2	2.00	3.34	2.14	5.55	3.49	1.34	0.14	3.55	1.49
3	2.00	1.90	3.51	5.41	3.47	0.10	1.51	3.41	1.47
4	3.00	6.26	4.80	6.83	5.51	3.26	1.80	3.83	2.51
5	2.00	4.57	3.51	4.93	5.31	2.57	1.51	2.93	3.31
6	2.00	2.53	1.43	5.46	1.61	0.53	0.57	3.46	0.39
Total Difference (Neural Network):						9.77			
Total Difference (New Data Regression):							6.04		
Total Difference (Old Data Regression):								19.59	
Total Difference (Combined Data Regression):									10.76

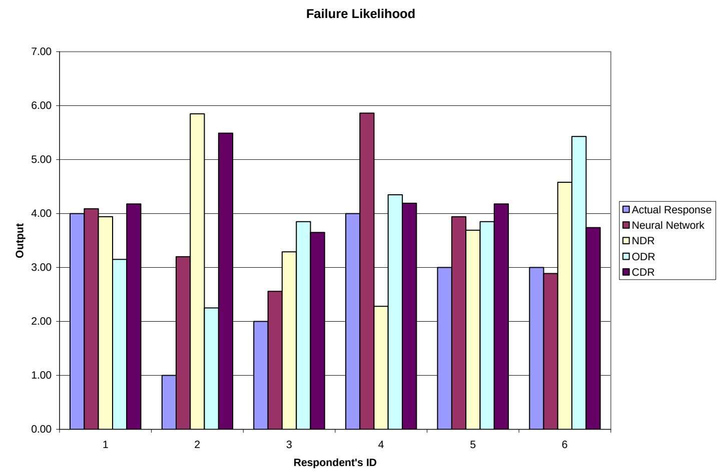
Model Closest to Actual Result:
NN – 2nd
NDR – 1st
ODR – 4th
CDR – 3rd

Language/Culture/Distance Problems Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	4.43	4.19	4.78	4.52	0.57	0.81	0.22	0.48
2	3.00	4.83	2.71	4.34	3.91	1.83	0.29	1.34	0.91
3	5.00	4.06	3.38	4.51	4.01	0.94	1.62	0.49	0.99
4	5.00	5.13	2.74	4.97	4.40	0.13	2.26	0.03	0.60
5	6.00	3.98	4.19	4.94	4.84	2.02	1.81	1.06	1.16
6	5.00	4.51	3.72	4.07	4.11	0.49	1.28	0.93	0.89
Total Difference (Neural Network):						5.98			
Total Difference (New Data Regression):							8.07		
Total Difference (Old Data Regression):								4.07	
Total Difference (Combined Data Regression):									5.03

Model Closest to Actual Result:
NN – 3rd
NDR – 4th
ODR – 1st
CDR – 2nd





Turf War (Teamwork) Problems Consequence Validation Table:

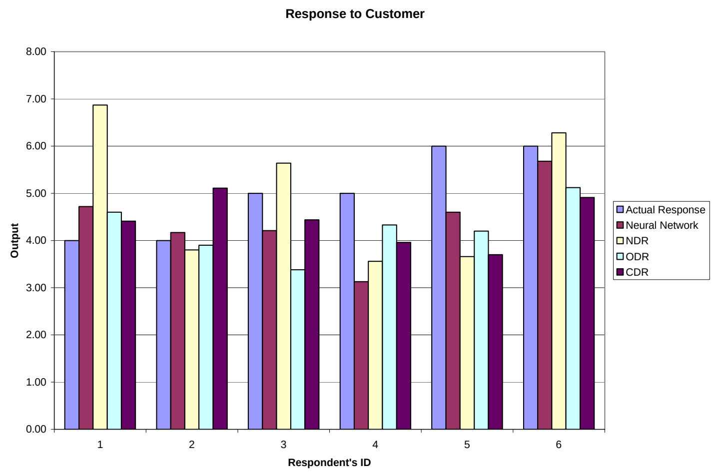
Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	5.00	5.40	3.80	4.62	5.36	0.40	1.20	0.38	0.36
2	4.00	4.15	3.79	2.94	5.41	0.15	0.21	1.06	1.41
3	3.00	4.20	5.11	3.16	3.67	1.20	2.11	0.16	0.67
4	5.00	5.78	2.56	5.20	4.72	0.78	2.44	0.20	0.28
5	5.00	4.50	3.80	3.12	4.02	0.50	1.20	1.88	0.98
6	5.00	3.87	2.94	5.60	4.02	1.13	2.06	0.60	0.98
Total Difference (Neural Network):						4.16			
Total Difference (New Data Regression):							9.22		
Total Difference (Old Data Regression):								4.28	
Total Difference (Combined Data Regression):									4.68

Model Closest to Actual Result:
NN – 1st
NDR – 4th
ODR – 2nd
CDR – 3rd

Failure Likelihood Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	4.00	4.09	3.94	3.15	4.18	0.09	0.06	0.85	0.18
2	1.00	3.20	5.85	2.25	5.49	2.20	4.85	1.25	4.49
3	2.00	2.56	3.29	3.85	3.65	0.56	1.29	1.85	1.65
4	4.00	5.86	2.28	4.35	4.19	1.86	1.72	0.35	0.19
5	3.00	3.94	3.69	3.85	4.18	0.94	0.69	0.85	1.18
6	3.00	2.89	4.58	5.43	3.74	0.11	1.58	2.43	0.74
Total Difference (Neural Network):						5.76			
Total Difference (New Data Regression):							10.19		
Total Difference (Old Data Regression):								7.58	
Total Difference (Combined Data Regression):									8.43

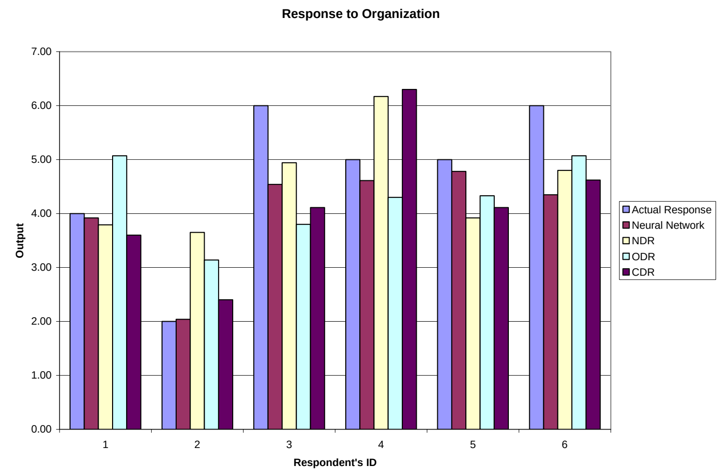
Model Closest to Actual Result:
NN – 1st
NDR – 4th
ODR – 2nd
CDR – 3rd



Response to Customer Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	4.00	4.72	6.87	4.60	4.41	0.72	2.87	0.60	0.41
2	4.00	4.17	3.80	3.90	5.11	0.17	0.20	0.10	1.11
3	5.00	4.21	5.64	3.38	4.44	0.79	0.64	1.62	0.56
4	5.00	3.13	3.56	4.33	3.96	1.87	1.44	0.67	1.04
5	6.00	4.60	3.66	4.20	3.70	1.40	2.34	1.80	2.30
6	6.00	5.68	6.28	5.12	4.91	0.32	0.28	0.88	1.09
Total Difference (Neural Network):						5.27			
Total Difference (New Data Regression):							7.77		
Total Difference (Old Data Regression):								5.67	
Total Difference (Combined Data Regression):									6.51

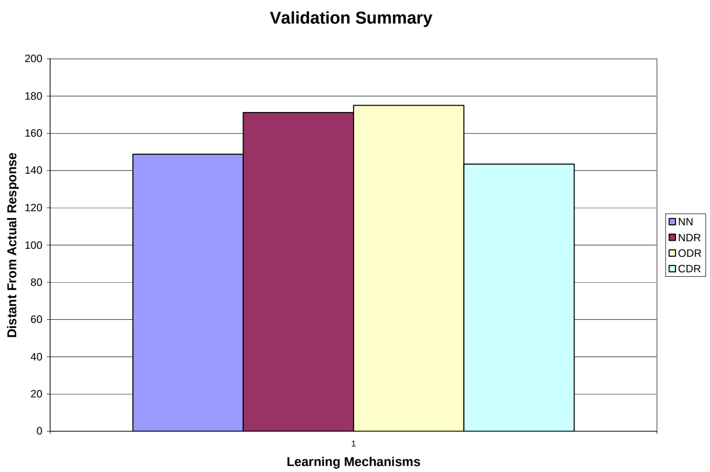
Model Closest to Actual Result:
NN – 1st
NDR – 4th
ODR – 2nd
CDR – 3rd



Response to Organization Consequence Validation Table:

Survey #	Actual Response	Neural Network	NDR	ODR	CDR	Diff. NN	Diff. NDR	Diff. ODR	Diff. CDR
1	4.00	3.92	3.79	5.07	3.60	0.08	0.21	1.07	0.40
2	2.00	2.04	3.65	3.14	2.40	0.04	1.65	1.14	0.40
3	6.00	4.54	4.94	3.80	4.11	1.46	1.06	2.20	1.89
4	5.00	4.61	6.17	4.30	6.30	0.39	1.17	0.70	1.30
5	5.00	4.78	3.92	4.33	4.11	0.22	1.08	0.67	0.89
6	6.00	4.35	4.80	5.07	4.62	1.65	1.20	0.93	1.38
Total Difference (Neural Network):						3.84			
Total Difference (New Data Regression):							6.37		
Total Difference (Old Data Regression):								6.71	
Total Difference (Combined Data Regression):									6.26

Model Closest to Actual Result:
NN – 1st
NDR – 3rd
ODR – 4th
CDR – 2nd



NN	NDR	ODR	CDR
148.81	171.2	175.01	143.46
2nd	3rd	4th	1st

Though Combined Data Regression (CDR) learning mechanism was closest in predicting the actual response, Neural Networks (NN) almost tied CDR by only 5.35 points. The NN and CDR performance results were reasonable due to both being trained with all the data.

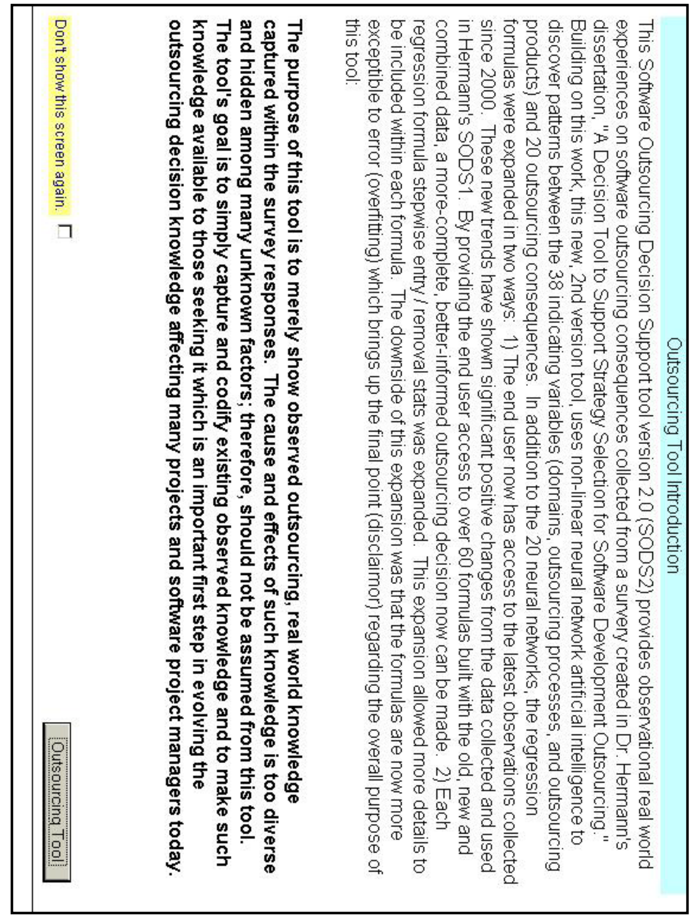
There was a tight correlating coupling between all four learning mechanisms with a few exceptions. In these exceptions, New Data Regression (NDR) and Old Data Regression (ODR), found problems with interpolation which would cause an extreme output greater than seven or less than one. This was due to by not having enough data in either case which was the reason why the CDR was included.

Appendix I - SODS2 Window Outline

1.1 SODS2 Introductory Window

With the MS Access VB development tool, an introductory window, found in Figure 1 below, provided the user a short description of SODS2 along with a disclaimer that such an observational tool should not be mistaken for an experimental cause and effect tool. This application was built to provide observational type knowledge. Along with this user's introductory guidance, SODS2 used an immediate startup module. Upon the user opening the outsourcing MS Access database, the introductory window would immediately be opened and maximized to enforce a certain flow for this and the other windows to follow. Along with this maximizing feature, the window control buttons normally found on the top right corner were turned off preventing the accidental bypass of such an orderly window flow. This provided SODS2 a user friendly approach. Once the introductory window has been displayed for the very first time, the user could select to turn it off and immediately proceed to the maximize version of the main window.

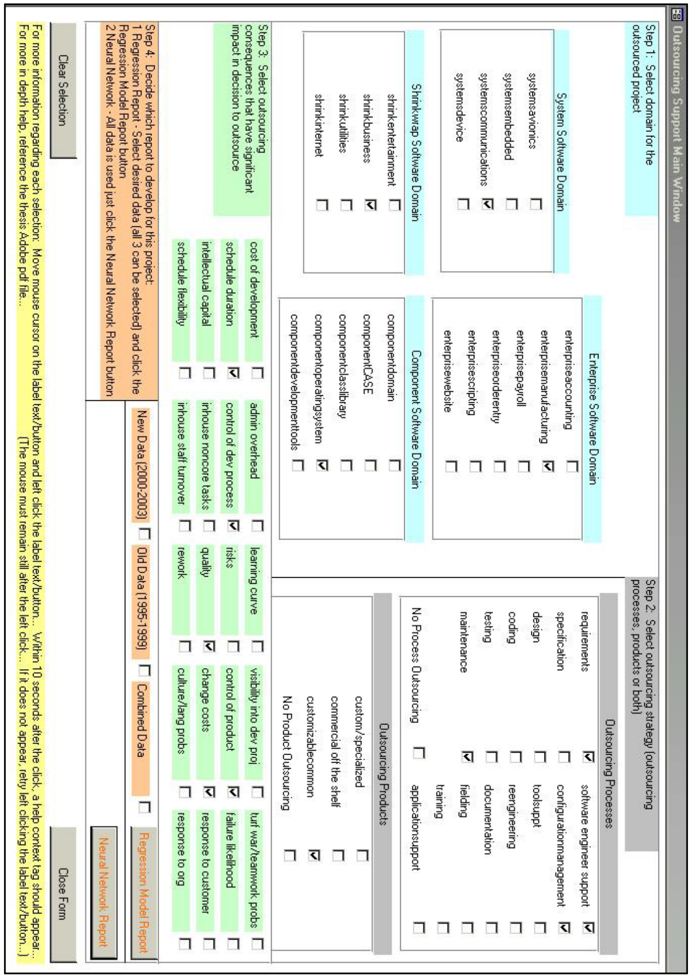
Figure 1 SODS2 Introductory Window



1.2 SODS2 Main Window

The main window, found below in Figure 2, provided the user an easy “point and click” interface for all required input. Help labels were added to guide the user through each color coded input division. Smart help tags were also added so additional information regarding each input and command button would be displayed as needed. This window also would open maximized to provide an orderly SODS2 window flow. Four command buttons were found on this window. Clear selected input command button allowed the user to wipe away all selections. Close SODS2 application command button allowed the user to exit the application and provided normal access to the database contained within the application. NN report command button took the user’s inputs and proceeded to opening a maximized NN report window. Regression report command button took the user’s inputs and proceeded to opening a maximized regression report window.

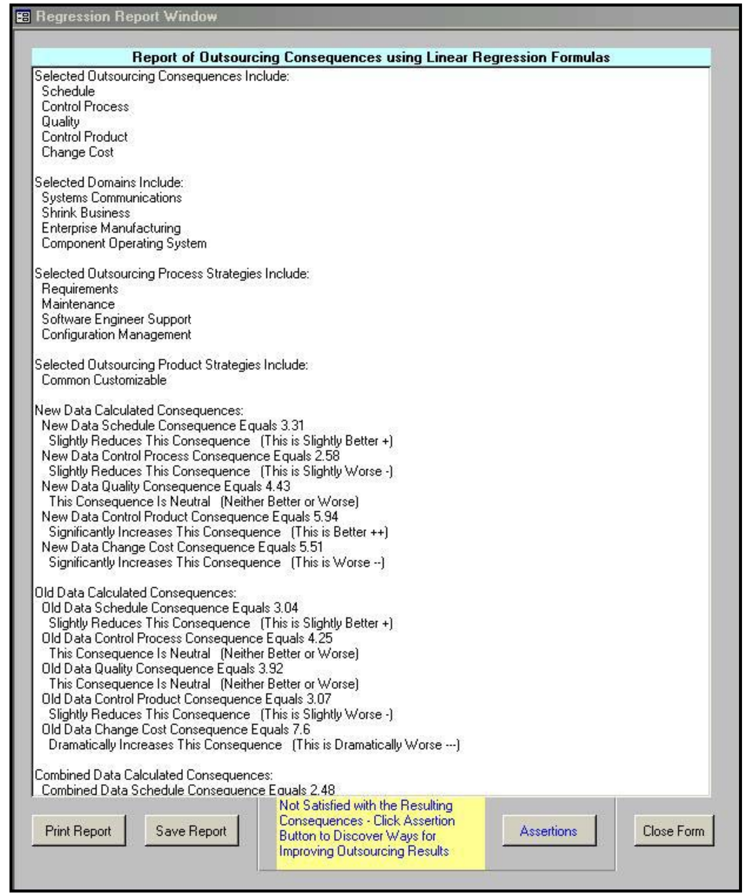
Figure 2 SODS2 Main Window



1.3 SODS2 Regression Report Window

Upon the regression report command button being clicked, a regression report window, found below in Figure 3, would be opened fully maximized with all right top corner window commands turned off. Upon SODS2 opening this window, all information relating to the regression report was transferred so that regression results can be correctly displayed, printed and/or saved. Each of these functions was found coded behind their respective command buttons. Before printing or saving such report, the user was given edit capabilities making the versatility of such a report much more dynamic. The logic behind the results also provided the user an easy to use application. Based upon the regression model report command button (located in the main window) being clicked, SODS2 would decipher the user's inputs and selected consequences to generate the associated regression model output. Such output would use the regression logic to determine whether the proposed outsourcing plan was favorable or unfavorable. This output decision came complete with better/worse scale. Any consequence that this logic found as "dramatically better" received "+++," "better" received "++," "slightly better" received "+," "neutral or no change" received nothing, "slightly worse" received "-," "worse" received "--," or "dramatically worse" received "---." All inputs and outputs were then displayed in an orderly fashion within the main text box. From this window the user was given a command button to allow a review of the corresponding assertions (those methods found to increase outsourcing success). Once this button was clicked, the application would open that report window. Once the user finished viewing the regression report window, a close button provided the means to exit this window taking the user back to the main window.

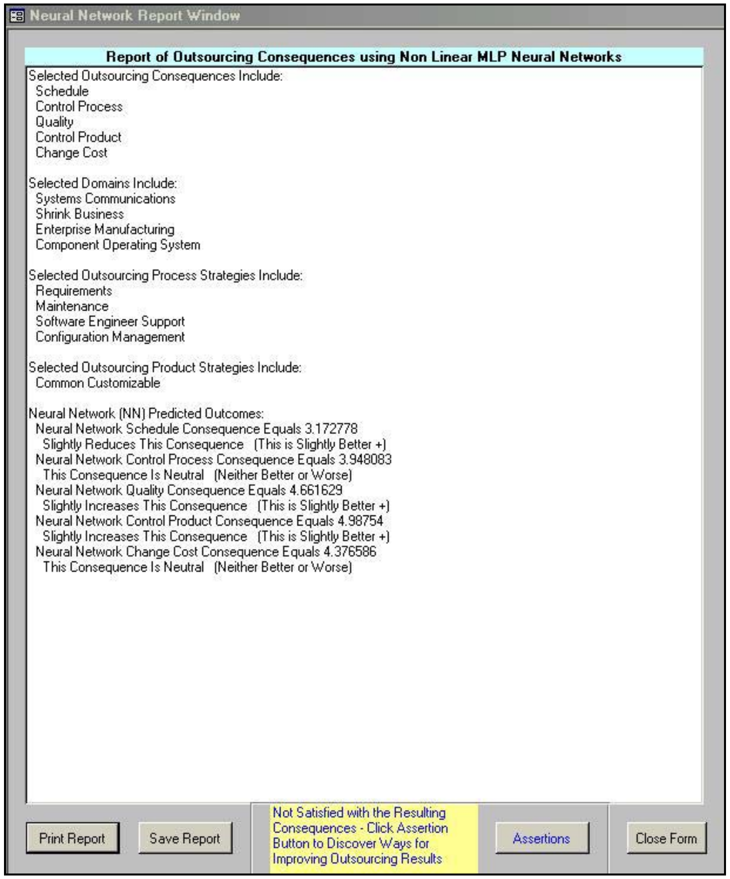
Figure 3 SODS2 Regression Report Window



1.4 SODS2 NN Report Window

Upon the NN report command button being clicked from the main window, a NN report window, found below in Figure 4, would be opened fully maximized with all right top corner window commands turned off. This window duplicated all the same features found in the regression report window with the exception that the results were calculated with the corresponding NN consequence DLLs.

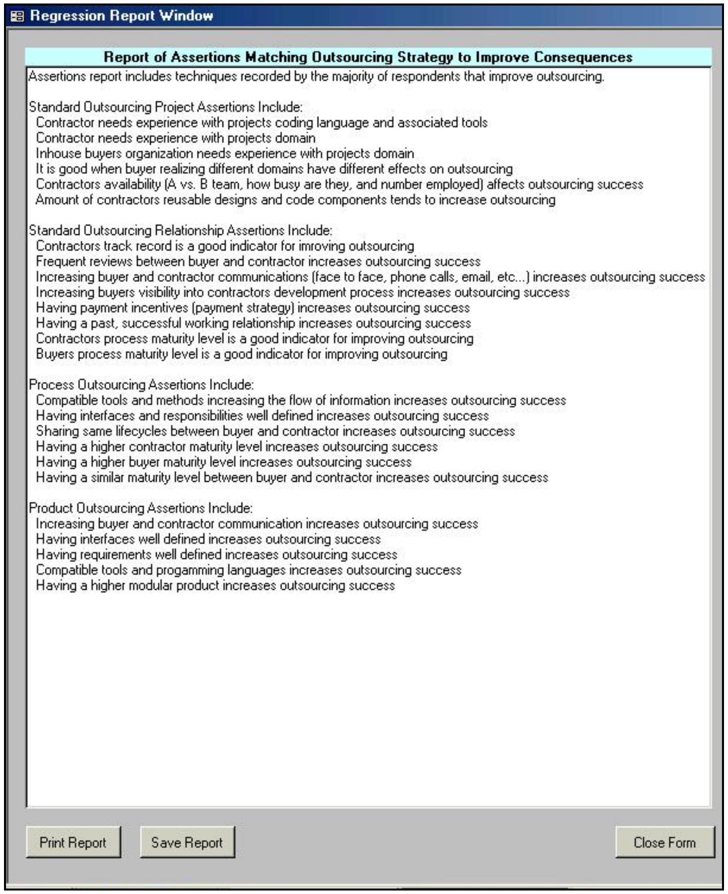
Figure 4 SODS2 NN Report Window



1.5 SODS2 Assertion Report Window

From both the regression or NN report windows, the user was given a command button that would allow them to view this assertion report illustrated in Figure 5. This report was very useful when the tool indicated worse than expected consequence results and the user was limited in making strategy changes. Thus, these assertions reported within this window would guide the user to make the best of the given situation. This report like the others would open maximized with the window control button at the top right corner turned off. The report also used logic to decide which assertions were appropriate given the user's input. Again, like the other report windows, this information was editable, printable and savable.

Figure 5 SODS2 Assertion Report Window



REPORT DOCUMENTATION PAGE						*Form Approved* *OMB No. 074-0188*
The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to an penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**						
1. REPORT DATE *(DD-MM-YYYY)* 23-03-2004			**2. REPORT TYPE** **Master's Thesis**			**3. DATES COVERED** *(From – To)* Jun 2003 – Mar 2004
4. TITLE AND SUBTITLE SOFTWARE DEVELOPMENT OUTSOURCING DECISION SUPPORT TOOL WITH NEURAL NETWORK LEARNING						**5a. CONTRACT NUMBER**
						5b. GRANT NUMBER
						5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S) Newberry, James D., Captain, USAF						**5d. PROJECT NUMBER**
						5e. TASK NUMBER
						5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(S) Air Force Institute of Technology Graduate School of Engineering and Management (AFIT/EN) 2950 Hobson Way WPAFB OH 45433-7765						**8. PERFORMING ORGANIZATION REPORT NUMBER** AFIT/GCS/ENG/04-16
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Maj Robert Weber AFIT/LSS 3100 Research Blvd 255-7777, x3260 Kettering, OH 45420-4022 Robert.Weber@afit.edu						**10. SPONSOR/MONITOR'S ACRONYM(S)**
						11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.						
13. SUPPLEMENTARY NOTES						
14. ABSTRACT The Air Force (AF) needs an evolving software tool for guiding decision makers through the complexities of software outsourcing. Previous research identified specific outsourcing strategies and linked them to goals and consequences through a variety relationship rules. These strategies and relationship rules were inserted into a decision support tool. Since that time, more historical data and outsourcing literature has been collected thus necessitating an update to such a tool. As the number of software outsourcing projects are completed, the AF must capture the outsourcing decision experiences which guided the projects and their outcomes. In order to efficiently incorporate this new experience, the decision tool must be redesigned to allow the additional knowledge to be added in such a way that the decision rule base is automatically updated. With this new feature, the tool would increase its precision of predicting software outsourcing success as the software outsourcing knowledge evolves. Capturing software outsourcing as knowledge instead of raw information will help guide decision makers down paths proven to succeed staying clear of risks that historically plagued software outsourcing projects of the past. Software outsourcing decision makers desire not only a characterization of past experiences and predictions of future outcomes, but also reasons to help them make informed decisions.						
15. SUBJECT TERMS Software Outsourcing, Decision Support Tool, Stepwise Regression, Neural Networks, Knowledge Management, Outsourcing Survey, In house Software Development, Contracting Software Development, Software Development Oversight Management						
16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON** Brian G. Hermann, Lt Col, USAF (LSS/GCS)	
REPORT U	**ABSTRACT** U	**c. THIS PAGE** U	UU	246	**19b. TELEPHONE NUMBER** *(Include area code)* (937) 255-7777, ext 3131; e-mail: Brian.Hermann@afit.edu	

Standard Form 298 (Rev: 8-98)
Prescribed by ANSI Std. Z39-18